

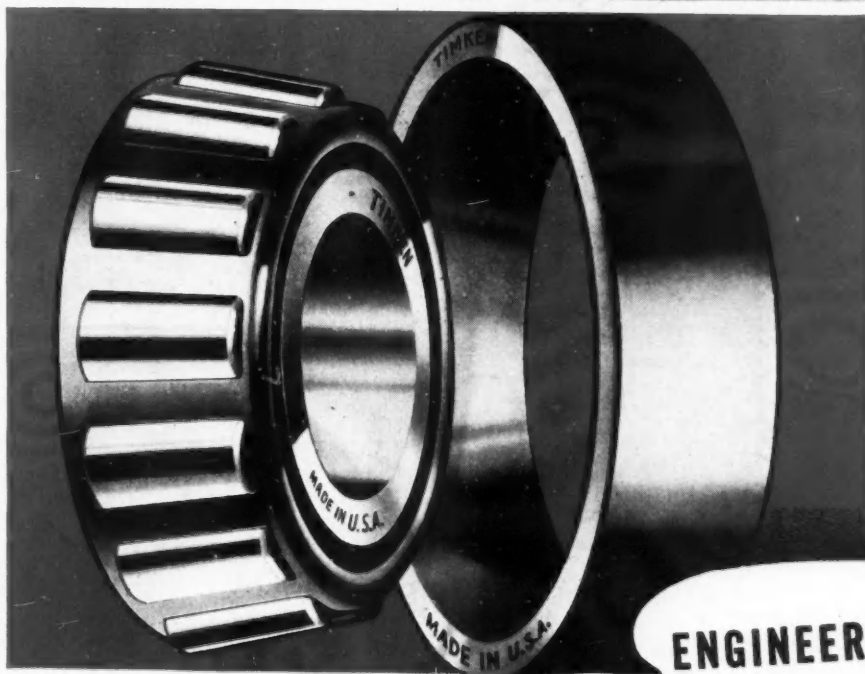
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AUTOMOTIVE INDUSTRIES

LAND — AIR — WATER

AUGUST 7, 1937

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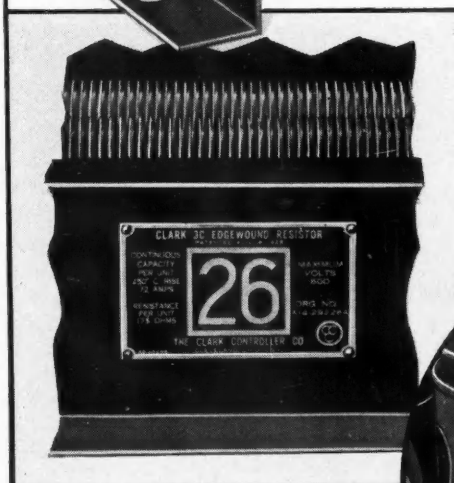
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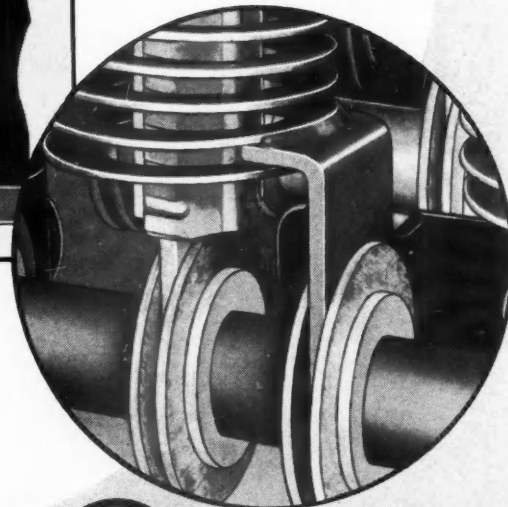
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- Flexibility in dimensions makes possible installation in limited space.
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Left. Complete identification name plates, giving essential resistance and capacity data, are welcomed by the Stock Room and Maintenance Department. Indicating numbering or lettering systems with large, legible figures are available to suit the customer's nomenclature or code.

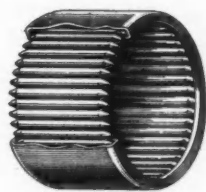
Right. Welded terminals that stand up under expansion, contraction and vibration give positive, constant contacts.



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A word about PERFORMANCE and this new NEEDLE BEARING



WHEN the first Torrington Needle Bearing was made about four years ago, it introduced an entirely new principle in bearing design: a complete anti-friction unit with a full complement of needle rolls held within a single compact retaining shell. As its small size required no more space than a bushing, it was felt that its major market would be found in applications where bronze or babbitt bushings would normally be employed.

Of course, at that time, there had been no experience on how this entirely new Needle Bearing would stand up in actual use, so a series of exhaustive tests was made. One of these made a particularly interesting demonstration of the performance of the Torrington Needle Bearing in a rotary application. This summary is from the Torrington Research Department's records.

A Typical Rotary Application

An automobile water pump was selected as the subject of this test because it was believed the bronze bushings in it were not adequate for the high sustained speeds demanded by the modern automobile operator. Packless pumps were being introduced and their success depended on bearings which would not wear and allow the glands to get out of line. It was a simple matter to substitute Torrington Needle Bearings for the bronze bushings and afforded a quick way to make a practical test.

Three pumps were set up with a pulley drive in accordance with the accompanying diagram. The pulley sizes used were the same as regularly used in the make of car from which the pumps were taken. The drive pulley shaft was driven by a 10 H.P. electric motor.

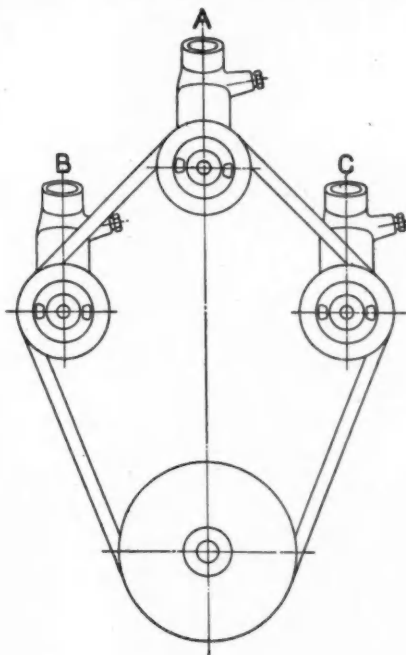
Pump (A) was installed as made by the manufacturer with the regular bronze bushings and equipped with pressure type fittings for lubrication. Pump (B) was fitted with two Torrington Needle Bearings, and pump (C) with one Torrington Needle Bearing, which was placed under the pulley where the greatest load occurs. The remaining bronze bushing was left in place. The shaft carrying the

drive pulley was also mounted on Torrington Needle Bearings.

All pumps were connected up to pump water in the regular manner.

The drive pulley was then run con-

Diagram of the Set-up Used to Test the Torrington Needle Bearing in an Automobile Water Pump



tinuously at 4200 R.P.M., giving a pump speed of approximately 7100 R.P.M., which was equivalent to a sustained car speed of approximately 100 miles per hour.

This speed was continuous over a 24-

hour day, with one stop each 24-hour period for lubrication only. The test ran until the morning of the fourth day when, at the end of approximately 96 hours of continuous operation, the shaft of pump (A), with bronze bushings, had worn through the bushings and cut right through the cast-iron pump body so that the pump was a complete failure. Pumps (B) and (C) were found to be in perfect operating condition.

An interesting note is that the belts used averaged 32 hours before breaking. This will give some idea of the extra load imposed in this test and not encountered in actual operation.

Additional Data Accumulated

This test was made over three years ago. Pumps similarly fitted with Torrington Needle Bearings have been operating on the road during the three-year interval with excellent results.

In addition, results of many other tests covering a wide range of commercial uses and based on actual conditions have been accumulated. A representative of the Torrington Engineering Department will be glad to investigate any application you have under consideration with a view to determining the suitability of the Torrington Needle Bearing. Complete information is given in the Needle Bearing Catalog, available on request. Write for Catalog No. 7.

The Torrington Company
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Torrington, Conn., U.S.A.

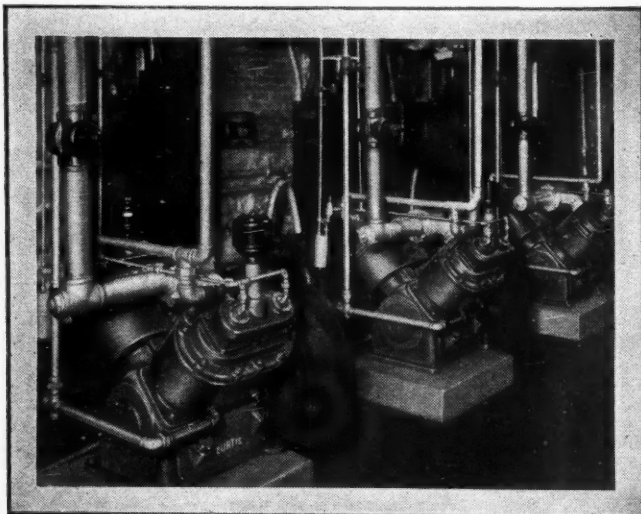
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August 7, 1937

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Contents

News of the Industry	167
Business in Brief	172
Calendar of Coming Events	175
Production Setup at Minneapolis Promotes Flexibility . By Joseph Geschelin	176
Just Among Ourselves	187
Trailers Fabricated by Advanced Methods	188
Mechanical Drawings of the Seagrave V-12 Engine	189
Mechanical Drawings of the DeSoto Hypoid Gears	191
New Developments	196
Railcar Practices Discussed	198
Powder Shows Cathode Ray Tracing	200
Improved Type of Injection Nozzle	201
Advertisers' Index	62

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1937 Model Production Near End

Ford Resumption to Bolster August Output; Car Changes To Be More Extensive Than Originally Planned

Return of the Ford Motor Co. to production Aug. 9 temporarily will bolster the industry's output which is now in a sharp seasonal decline. Few assembly lines will operate the full month of August. At least nine companies expect to wind up their 1937 model runs this month. Three finished up in July and three are slated to run a week or so in September. Schedules might be upset by labor difficulties but as it looks now, the middle of next month is likely to see the books closed on 1937 production.

Comparatively few 1938 models will be turned out this month. Three companies are expected to be under way on a small scale before the end of August. For the most part, the assembly lines will be down for a period of about three weeks. The bulk of September's output, however, should be of the 1938 vintage as new model introductions will begin coming late that month, following in rapid succession throughout October.

Most of the companies are well along with their new programs and unlike other years, there is no talk of any company being late with its announcement. Tool and die shops are operating at the peak rate for the year and expect to meet their delivery schedules. This branch of the industry is enjoying a heavier volume of business than had been anticipated earlier. Automobile companies this year are farming out more work to the independent shops than has been their practice, and model changes are said to be a little more extensive than they were at first thought to be. There are fewer eleventh hour changes of design this year, according to the tool and die shops.

August production of the industry will run considerably higher than in August last year. The increase should run from 25 per cent to 30 per cent, depending on whether Ford Motor Co. operates on a four or five day schedule after it resumes. As yet this has not been determined. At this time of the year, with some plants winding up and others feeling their way into new programs, projections on output are uncertain, but a preliminary estimate for the month indicates that around 350,000 units will be built. This com-

pares with an estimated 445,000 units in July and 275,934 in August last year.—H.E.G.

July deliveries by Pontiac dealers were 21,436 compared with 22,662 in June, a five per cent decline, which is much smaller than is customarily experienced at this season of the year. July figures were 28 per cent above the deliveries a year ago when they reached 16,674. Last year July deliveries
(Turn to page 170, please)

Plan Labor Act "Teeth"

**Murphy, Roosevelt Discuss
Employer Penalties**

Strengthening of National Labor Relations Act so as to provide more severe penalties for violations by employers but not for labor organizations is said to have been one of the important subjects discussed by President Roosevelt and Gov. Frank Murphy of Michigan when Murphy was the weekend guest of the President.

Other guests included Senator Theodore Greene, Democrat of Rhode Island, and Secretary of the Interior Harold L. Ickes who shared in the discussions which took in a wide range including court "reform" and which many think may lead to a broad realignment of political parties in the field for the 1940 presidential campaign. Essentially it is said to indicate moves for amalgamation of so-called "Progressives."
(Turn to page 171, please)

Rogers' Confirmation Seen

Senate confirmation is expected to be given the Presidential nomination of John L. Rogers, director of the Bureau of Motor Carriers, as a member of the Interstate Commerce Commission.

His selection as the first director of the Bureau of Motor Carriers was due in large measure to the painstaking study he made of motor carriers over a period of years, especially in connection with his service with the Federal Coordinator of Transportation, prior to passage of the Motor Carrier Act. Other outstanding ICC activities in which he engaged concerned such prominent cases as the six-hour investigation, refrigeration charges and loco-
(Turn to page 170, please)

General Motors Car Prices Increased

All General Motors car manufacturing divisions announced price increase on 1937 models on Aug. 5 or indicated that such announcements would be made within a few days. The increases that were made known to dealers ranged from \$45 to \$100.

This action followed by only a week the Ford Motor Co.'s move in raising prices \$15 to \$35 on models constituting about 90 per cent of its production. The Ford move in turn came just after A. P. Sloan, Jr., chairman of the board of General Motors, stated in his quarterly report to stockholders that price increases were "necessary."

Buick prices are to go up \$45 on the series "40" and "60", and \$100 on the series "80" and "90".

Oldsmobile prices will go up \$45 on all models effective Aug. 9.

Cadillac prices will go up \$100 on all models. LaSalle prices are being advanced \$60 on all models. The effective date is Aug. 14.

Pontiac officials said price advances would be "in line."

Chevrolet officials indicated that a price announcement was imminent.

Riot, Strike at Plymouth

**UAW Men Beat Independent
Association Leaders**

A riot at the Plymouth Motor Corp. plant on the afternoon of Aug. 4 sent nine men to hospitals, brought out a concentration of police forces and resulted in the closing of the plant. The trouble was precipitated by the beating of two leaders of the newly-formed Independent Association of Chrysler Employees for which four UAW men were discharged. UAW members then stopped work in a key department which resulted in the closing of the plant at 2 p. m.

The corporation considers the whole affair a serious violation by the UAW of their contract with the corporation, said Lester L. Colbert, Chrysler attorney, in an official statement. He charged UAW members with forcibly ejecting
(Turn to page 174, please)



KELLEY



BREER



SKELTON

... were added to the board of directors of Chrysler Corp. on August 3. Nicholas Kelley is a member of the law firm of Larkin, Rathbone and Perry, general counsel to the corporation. Carl Breer and Owen Skelton are two of a team of three engineers who joined Walter P. Chrysler in the early days of the

company, and worked with him in developing the first Chrysler car. The third, Fred Zeder, is already on the board. The engineering team has designed all Chrysler, Dodge, DeSoto and Plymouth cars since then. Mr. Kelley will continue as his legal organization as well as serving as a Chrysler director.

U. S. Cars, Trucks in Demand Abroad

Reeves, Returning from Chamber of Commerce Meeting, Reports Wide Sales Increase and Good Prospects

European automobile factories and dealers handling American cars and trucks are having a "field day," according to Alfred Reeves, vice-president and general manager of the Automobile Manufacturers Association, who returned on the *Bremen* Aug. 2 following an inspection of the industry in Europe.

Important and far-seeing resolutions were passed by the International Chamber of Commerce, many of which will further aid the sale abroad of U. S. motor vehicles, he said. The chamber recommended that any changes in tariffs be published to give exporters and importers an opportunity to adjust their business. Governments were memorialized to refrain from sudden changes in quotas, the chamber feeling that four months' notice should be given to protect importers, he said. Mr. Reeves attended a chamber meeting in Berlin at the end of June.

"The dealer in American cars is in a fine position in France, Italy and Denmark, particularly, where local laws put the quotas in their hands—not in the hands of the American manufacturers," he pointed out. "As a result, good, energetic dealers are in great demand by American manufacturers because only through those who have been established can American vehicles be sold in those countries."

"The biggest increase in sales is found in the Scandinavian countries," Mr. Reeves said. "England probably shows the next largest increase of sales for both domestic and American cars and trucks."

European manufacturing is strong. This year will see about 425,000 units built in England, 325,000 in Germany and 200,000 in France, Mr. Reeves believes.

Throughout Europe the highway-building programs are progressing rapidly. Great Britain is rapidly widening and rebuilding highways, Paris is busy building undercut passes, and the German Autobahn project of through, express highways is making fast progress. "Motorists are considered to be dawdling if they drive under 75 m.p.h. on these fine German roads," Mr. Reeves said.

Automobiles, he found, were one of the most important features of the Dusseldorf show. Throughout Europe the show business is a far more serious matter with industry than in this country—at least until the recent "epidemic" of world fairs.

"However, their automobile shows lack the action of the American shows. They like the cut-away chassis and moving displays, and the brilliant showmanship of American shows, but find these devices are too costly," he said.

On the other hand, dealers and manufacturers have built show buildings for permanent displays of motor vehicles, he said.

Diesel Use Increases

Automotive World News, published by the Department of Commerce, reports that:

"The participation of Diesel trucks and buses continues to show a rapid increase, 79,632 vehicles identifiable as such being reported for the year just closed. This number represents a gain of 53 per cent over 1935 and is practically double the 37,816 Diesel units supposedly in use during 1934. Germany accounts for 33,900 Diesel units as compared with 15,000 during 1935; France now includes 15,300 as against

12,200; the United Kingdom 14,911 against 11,115; the Netherlands reports 900 compared with 675; Argentina now has 820 while in 1935 the Diesel units only accounted for 330 units; Austria has increased from 15 to 278 and Yugoslavia now has 370 as compared with only 5 Diesels in 1935."

Motoring in Europe

Nearly 3000 Cars Taken Thus Far in Season

An all-time high in the number of Americans motoring abroad has been reached during the first seven months of this year, according to Jerry D. Ryan, manager of the foreign travel division, American Automobile Association. To date 2995 cars have been booked to Europe and the Near East, and 895 additional motorists have made arrangements to drive European cars for their business trips and vacations. The 1936 figures for the first seven months were 2263 and 469, respectively.

The AAA books about 70 per cent of all the American motor tourists. These bookings are made by members from their local clubs through the foreign travel division, and by steamship lines which have made arrangements with the AAA to handle this type of booking. The United States Lines, French Line, and Cunard Line handle their own bookings of U. S. tourists, accounting for about 30 per cent of the total.

Forty-four states of the union and 23 foreign countries were represented by the 1936 bookings of the 2589 AAA tourists. A number of foreign motorists have asked the AAA to ship new American automobiles to the country they plan to tour, together with all the papers required. The motorist and his family take a steamer to the European port, have the use of the new car, bought through some importer, and have it sent to their home without touching the United States. Many of these deals have been made by South Americans, Canadians and other nationals who find a tariff advantage as well as a convenience in this method. A number of the 50 during 1936 were Chinese customers who have been anxious to see Europe by car, and want an American-built automobile, too.

"Primarily, however, this is a service to AAA members. We found that to make it advantageous the service had to be properly organized in every detail. We have put the whole thing on a business basis throughout," said Mr. Ryan.

The record bookings handled by the AAA were on the *Normandie*, east-bound voyage of June 16, when 66 cars were shipped. The latest *Normandie* booking was 24, on the westbound record-breaking trip Aug. 2, when 24 cars were brought home by motor tourists.

UAW Promises "No Wildcat Strikes"

Martin Gets Lewis' Backing for Move; Ridicules Chrysler Employees Association; To Demonstrate at Dearborn

The General Motors preliminary conference with the United Automobile Workers on the matter of a guarantee against unauthorized strikes has been resumed after a recess of several days, called to give UAW-President Homer Martin an opportunity to confer with John L. Lewis in Washington. He was accompanied by his chief organizer, Richard T. Frankenstein.

After the Washington conference, Martin promised there would be no unauthorized strikes as he had been given authority to take necessary disciplinary action and was assured of CIO support in carrying out contracts made with employers. Those responsible hereafter for outlaw strikes are to be suspended immediately from the national organization. Martin declared that the GM negotiations were progressing satisfactorily and that through rigid discipline he expected to meet the demands of GM-President W. S. Knudsen. He denied published reports that Vice-Presidents Wyndham Mortimer and Ed Hall had been removed from the GM negotiating committee because they had been responsible for several of the "wildcat" strikes in GM plants. Both are still members of the committee and sit in on conferences from time to time, union headquarters stated.

Martin predicted that Henry Ford would sign a contract with the UAW before the end of the year, but did not anticipate that any strike would be called at the Rouge plant of Ford Motor Co., indicating that the situation there was controlled by supplier plants and assembly branches which are organized.

The UAW is busy with plans for its annual convention at Milwaukee starting Aug. 23. Convention headquarters will be at the Schroeder Hotel, but meetings are to be held at the Eagle's Hall. Approximately 2000 are expected to attend, of which 1500 will be delegates, according to union leaders. The executive board of the union will hold its quarterly meeting in Milwaukee, starting Aug. 9. Although union leaders admit a cleavage in the ranks on certain issues, Martin is said to have no opposition in his candidacy for the presidency. One of the principal issues is the centralization of authority in the president, as favored by Martin. Another faction, headed by Wyndham Mortimer and Ed Hall, favor the spreading of executive authority and more autonomy for the locals.

Dearborn Drive Planned

Another demonstration and mass distribution of the UAW paper in Dearborn is scheduled for Aug. 11. In a radio address Tuesday evening, Homer Martin appealed to all locals to send unemployed members to Dearborn on that date. He has also ap-

pealed to Gov. Murphy and the chief of police of Dearborn for full protection for the demonstrators.

At request of the Independent Association of Chrysler Employees, a police detail was sent to protect Plymouth workers changing shifts after a member of the association was allegedly beaten by UAW members last week. The new organization continues active solicitation of members and recently announced addition of two members to the executive board. The new men are Michael L. Beck, who will act as organizing director, and Albert Feorentino, who is to be publicity director. Officials said that representatives of the AFL had approached them on the matter of affiliation, but had been informed that the Association was not interested. Homer Martin ridiculed its claim of 26,000 members in Chrysler plants, declaring "we are not concerned with a company union which has been given forced birth by the Chrysler Corp."

Chris-Craft Corp., which recently signed a year's contract with an AFL union for a closed shop when its UAW contract expired, has been sent new demands by the UAW. Organizer Gilbert Clark stated that the case will be taken to the labor board, indicating that an election probably would be requested to determine which union was to represent the workers. The plant at Algonac, Mich., is closed until Aug. 9 for annual inventory. The UAW asks sole bargaining rights, minimum wages of 75 cents an hour, eight-hour day, 40-hour week and time and a half for overtime, Sundays and holidays.

Striking employees of the Gale Mfg. Co. at Albion, Mich., were served with injunctions restraining them from picketing after pickets had overturned

(Turn to page 193, please)

Scouts Ford "Showdown"

More CIO efforts to organize the Ford Rouge plant but nothing in the nature of a showdown this summer are expected by Governor Frank Murphy of Michigan. In a brief interview with reporters at the County Airport, Pittsburgh, the Governor, returning from a weekend visit with President Roosevelt, said the outstanding thing about labor relations currently is the lack of rancor and hatred.

Governor Murphy said he thought sitdown strikes are a thing of the past. "It is not right and in a democratic form of government it is not necessary," he said.

The Governor added that automobile plant employment is at an all-time peak just now and that a tremendous number of men have been taken on in the past two weeks.

Ford Price Rises Cover Bulk of Production

About 90 per cent of the Ford Motor Co.'s volume is estimated to have been affected by the price increases announced, effective Aug. 2.

The Ford "85" has been raised \$25 on all large production models excepting the standard coupe which is up \$15. No change was made in the club, cabriolet, phaeton, roadster or convertible sedan prices. The "60" series was advanced \$35 on all models excepting the coupe which was not changed. Truck and commercial car prices are unchanged.

The company's brief announcement said of the reason for the unexpected move only that "The increase is attributed to rising costs."

Detroit reports indicated that at least one of Ford's major competitors is considering price increases but has not decided upon its course as yet. It has been widely expected, and even forecast as necessary by Chairman A. P. Sloan, Jr., of General Motors, that prices would be higher for 1938 cars, but the Ford decision to raise them now with only a few weeks remaining of the 1937 season was a complete surprise.

Car Price Body is Formed

The five-man commission which is to establish maximum trading prices for used cars under the new Pennsylvania control law has been chosen. Final choice, made by a committee, in the absence from the country of Governor Earle, was Oliver Plotzinger of Pittsburgh, dealer in used cars exclusively.

The other four members of the commission were selected by the Governor.

The four men are: Leo J. Spaeder of Erie, representing salesmen, William D. Teefy of Philadelphia, chairman of the commission and a representative of new car dealers, William A. Gallagher of Wilkes Barre, representing new car dealers, and William R. Tucker, Jr., of Philadelphia, the consumers' representative. Mr. Tucker is with the Pennsylvania Co. for Insurance on Lives and Granting Annuities.

The price fixing system will be financed by dealers, salesmen, appraisers and car owners. Cars intended for trading must have appraised values under the law.

Mr. Teefy, commenting on the administration of the law, said the primary objective will be to eliminate the "misrepresentations which have become increasingly general practice in the retailing of cars leading car buyers to believe they were getting more for their used car than they actually receive net." He assailed "hidden overcharges" and "adroit handling of finance and insurance charges." Mr. Teefy re-

(Turn to page 193, please)

CIT's Volume at Peak

Liquidity Improved; Net for Half \$3.43 a Share

A record volume of business in wholesale automobile paper was handled by Commercial Investment Trust Corp. in the first half of the year, and this, with peak business by factoring subsidiaries and wide gains in other categories, sent the total business volume for the period to new high levels.

The company reported net income for the period of \$11,573,865, equal after preference dividends to \$3.43 per common share on the 3,312,585 shares outstanding. This compared with \$9,757,387 or \$3.16 per share on the 2,836,923 shares then outstanding. The number of common shares increased through conversions of the preference shares.

The company stated that its volume of industrial receivables purchased increased faster than the gain in retail automobile notes, reflecting heavier sales of household appliances and industrial equipment. Rates on new business averaged lower than in 1936 but charges to be available for future gross earnings have been built up to \$31,201,710.

Breakdown of business done showed retail automobile notes bought at \$234,314,456 for the half year against \$206,572,499 for the 1936 period; industrial notes bought at \$71,470,350 against \$37,832,772; wholesale automobile notes \$306,328,327 against \$233,463,409 and factoring receivables at \$164,847,842 against \$122,386,138. Outstanding at the end of the half year were 68 per cent of the total purchases. The report said that cash and currently maturing receivables more than cover in less than five months total bank borrowings by the company of \$340,619,362.

The company confirmed recent reports that it is engaged in a drive to reduce the length of time given the public to pay notes bought by the company, although the experience on long term paper has been satisfactory.

Earnings as reported included for the half year \$1,037,667 undistributed net earnings of the National Surety Corp., now owned by CIT.

Rogers' Confirmation Seen

(Continued from page 167)

motive equipment studies and others.

Rogers was born in Knoxville in 1889. His career started in the mechanical department of the Southern Railway. Subsequently attending the University of Tennessee and George Washington University, Rogers obtained a degree in mechanical engineering and in 1917 he entered the service of the ICC as a mechanical engineer in the Bureau of Locomotive Inspection. After securing a degree from the National University Law School, Washington, Rogers was admitted to the bar. He was made special examiner in the ICC Bureau of Service in 1925 and was promoted to the position of executive assistant to the Federal Coordinator of Transportation in 1933.

There is considerable speculation as to Rogers' successor, who will be selected by the ICC. Among names mentioned are W. Y. Blanning, assistant director of the Bureau of Motor Carriers, former chief of the Bureau of Public Convenience, Pennsylvania Public Utilities Commission; W. A. Hill, chief examiner, Bureau of Motor Carriers, associated with the ICC for many years; and Walter Hayes, chief of Traffic Section of the Bureau, formerly in the Traffic Department of Sears, Roebuck & Co.

Near End of 1937 Runs

(Continued from page 167)

dropped 25 per cent below the June figure. Total Pontiac sales from the beginning of the 1937 model year were 197,340 on July 31 compared with 152,746 for the 1936 model on the same date last year. July production of 29,318 was the second largest of the year and was exceeded only by March when 29,791 cars were built. Used car sales also are relatively stronger than they were last year. During July Pontiac dealers sold 38,620 used cars, a drop of only 1000 from the June figure and 7400 cars higher than July of 1936.

United States retail deliveries of Studebaker passenger cars and trucks during the second ten day period of July totaled 2386 units, according to an announcement by George D. Keller, Studebaker vice president in charge of sales. This, compared with retail sales of 1629 units during the same period of 1936, is an increase of 46.5 per cent.

Willys-Overland Motors, Inc., produced 6889 cars, a daily average of 405 units, for the 17 working days in the month of July, against daily production of 320 in June, bringing the total for the current model to 60,537. A four day shutdown due to lack of materials plus holidays early in the month shortened the production schedule.

The coupe model introduced in June assumed a larger proportion of total output last month.

Buick deliveries in July totaled 22,065, the best July since 1927, comparing with 23,397 in the peak month of April.

W. F. Hufstader, general sales manager of Buick, announced that domestic retail deliveries for the second 10 days of July totaled 6094 cars comparing with 6144 in the first 10 days of the month and 4376 in the corresponding period a year ago. This was a gain of 1718 units or 39 per cent over the 1936 volume. Sales showed a smaller summer decline than was registered at this time a year ago.

He remarked that production is being maintained at more than 1000 cars a day to meet the continued demand with unfilled orders at the factory in excess of 16,000 units.

Used car sales by Buick dealers during the second 10 days of July totaled 10,474 units against 9847 in the first 10 days of the month, with used car stocks reduced to 30,171. At the current rate of sales this represents a turnover of the total used car stock once every 27.3 days.

New Passenger Car Registrations

	JUNE 1937	MAY 1937	JUNE 1936	SIX MONTHS		Per Cent Change, 6 Months, 1937 over 1936	Per Cent of Total Six Months		EIGHT MONTHS		
				1937	1936		1937	1936	1937 Models	1936 Models	Per Cent Change
Ford.....	85,113	94,007	80,527	492,404	415,772	+ 18.1	24.67	22.44	583,465	528,949	+ 10.6
Chevrolet.....	70,353	63,222	102,948	411,890	528,243	- 22.0	20.63	28.51	555,543	649,464	- 14.4
Plymouth.....	48,461	49,242	54,009	253,548	260,010	+ 1.2	13.20	14.03	352,951	322,882	+ 9.4
Dodge.....	26,207	27,183	26,841	144,567	130,593	+ 10.7	7.24	7.05	186,805	163,469	+ 14.1
Pontiac.....	22,705	24,246	19,537	116,476	91,849	+ 27.0	5.83	4.96	148,578	114,269	+ 30.0
Oldsmobile.....	21,039	22,308	21,558	107,344	108,742	- 1.1	5.38	5.87	131,662	136,310	- 3.5
Buick.....	21,172	21,851	16,174	104,358	82,000	+ 27.3	5.23	4.43	142,043	106,903	+ 33.0
Packard.....	10,074	11,400	5,515	57,542	28,703	+100.2	2.88	1.55	72,039	37,356	+ 93.0
Chrysler.....	9,181	9,390	5,915	48,002	30,627	+ 56.8	2.40	1.65	60,323	35,307	+ 70.8
Terraplane.....	8,301	7,694	8,802	44,215	42,937	+ 3.0	2.21	2.32	57,793	52,936	+ 9.1
Nash.....	7,618	8,725	4,568	41,698	22,873	+ 82.5	2.09	1.23	50,100	28,147	+ 78.2
Studebaker.....	7,040	7,805	7,187	40,922	35,464	+ 15.5	2.05	1.91	53,225	41,430	+ 28.6
De Soto.....	7,555	7,825	5,280	38,831	21,579	+ 84.0	1.99	1.16	48,796	28,338	+ 93.0
Willys.....	5,737	5,929	1,539	28,823	6,129	+370.0	1.44	.33	30,505	8,340	+266.0
La Salle.....	2,957	3,309	1,097	15,671	6,261	+150.0	.78	.34	20,143	8,453	+138.0
Lincoln.....	2,373	2,795	1,243	14,149	6,526	+117.0	.71	.35	17,913	7,498	+139.0
Hudson.....	1,593	1,589	1,987	8,974	12,315	- 27.0	.45	.66	12,340	16,483	- 25.0
Graham.....	1,404	1,450	1,837	7,672	8,492	- 9.5	.38	.46	10,210	10,324	- 1.2
Cadillac.....	1,131	1,466	1,035	6,737	6,074	+ 10.9	.34	.33	9,051	8,259	+ 10.0
Cord.....	136	135	182	687	568	+ 22.8	.03	.03	835	568	+ 47.0
Pierce-Arrow.....	6	16	58	142	405	+ 64.9	.01	.02	271	1,797	- 85.0
Auburn.....	3	11	167	136	1,289	- 89.6	.01	.07	242	561	+132.0
Miscellaneous.....	77	89	1,434	756	5,566	- 86.5	.05	.30	2,361	7,516	- 68.6
Total.....	360,236	391,697	369,422	1,996,356	1,853,017	+ 7.8	100.00	100.00	2,547,234	2,310,539	+ 10.1
Chrysler Motors.....	91,404	93,640	92,045	495,748	442,809	+ 12.0	24.83	23.89	648,875	546,976	+ 18.5
Ford and Lincoln.....	87,466	96,802	81,770	506,553	422,298	+ 20.0	25.38	22.79	601,378	534,447	+ 12.8
General Motors.....	139,357	156,402	162,348	762,478	823,169	- 7.2	38.19	44.44	1,007,060	1,023,658	- 2.2
All Others.....	41,989	44,853	33,259	231,577	164,741	+ 40.2	11.60	8.88	289,921	205,458	+ 41.7

Plan Labor Act "Teeth"

(Continued from page 167)

sives" of present various political affiliations. Support for this view was given by reason of the fact that during the previous week-end Senator LaFollette and Governor LaFollette of Wisconsin were the President's guests.

Pressing of the campaign for court reform by the President is tied in directly with proposals to tighten up the Labor Act since validation of the suggested more rigid terms might require a sympathetic court.

It is said that the plan in mind is to amend the Labor Act at the next session of Congress, although the President is reported to desire that the effort be made at the present session. Serious doubt that it could be done, however, makes it improbable that it will be recommended at the present session. According to reports, the Labor Act amendment would call for heavier fines and imprisonment for violation of an order of the National Labor Relations Board, to be inflicted directly on head officers of companies charged with violation.

The plan to push court "reform" involves an amendment to the constitution to increase the Supreme Court membership by two to eleven, and ask for ratification by the states. Senator Brown of Michigan has said he is prepared to submit the amendment and Governor Murphy, who will call a special session of the Michigan legislature in November to consider labor legislation, has said Michigan would be the first state to ratify the constitutional amendment if submitted at the present session of Congress.

Plant Notes

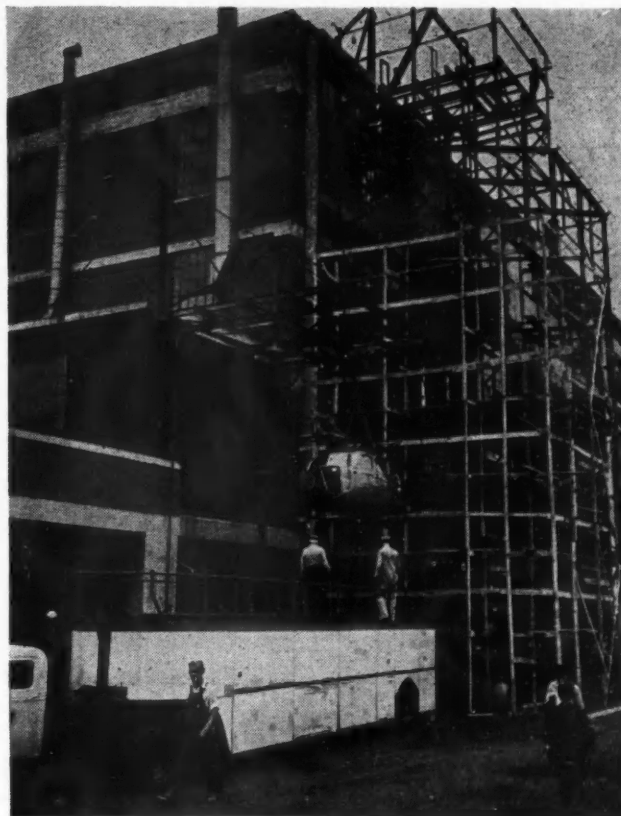
The Mather Spring Co., since 1911 a manufacturer of springs for motor cars, has acquired eight acres of land from the Standard Oil Co. of New Jersey at Linden, N. J., and will erect a \$500,000 branch plant there to employ about 300 workmen. It will serve the new Linden assembly plant of General Motors as well as Ford and General Motors plants at Tarrytown, Edgewater, Atlanta and Baltimore. The plant will be completed by March 1. It will be 420 by 220 ft. and one story high. A. Bentley & Sons, contractors, Toledo, will build the plant. Gordon M. Mather, president, announced there will be no curtailment at the Toledo plant, which now employs more than 450 men.

The American Forging & Socket Co. has let a contract for an addition to its manufacturing plant in this city which will provide approximately 20,000 sq. ft. of additional space at a cost, including equipment, of about \$150,000. Work has already been started and the new facilities are expected to be available Oct. 1.

(Turn to page 192, please)

SAVINGS

in time and greater efficiency in body handling are expected to result from the installation of a new enclosed lift at the Cadillac - LaSalle plant. The framework is shown behind a body being hoisted into the plant by the old method. The company will be able to handle bodies at the rate of 50 hourly against the present maximum of 18.



Is Vapor-Locking Diminished?

Natural Gasoline Association and Western Petroleum Refiners Association to Run Car Tests to Find Out

The tail is going to wag the dog a bit when tests of 1937 models are made by the Natural Gas Association of America and the Western Petroleum Refiners Association at Tulsa, Okla., to determine what makes of automobiles are most free from vapor-locking tendencies.

Heretofore, most tests made by the automobile and refining industries have been to determine characteristics of gasolines. Now refiners, particularly those who produce gasolines of high volatility, want to know what automobile designers have done to get the most efficiency and operating economy out of fuels made by refiners and natural gasoline manufacturers.

Although the cracking process came into use in 1912, it was not until 10 years later that it became widely used to meet the sharply increased demand for gasoline. This process produces a motor fuel of higher volatility than straight run gasoline. About 45 per cent of gasoline refined in this country is cracked and an equal amount is straight run. Ten per cent is manufactured from natural gas, which produces a fuel of high volatility.

The tests are expected to develop new data on vapor-locking and vapor loss tendencies at the carburetor bowl. This vapor which forms in the fuel system stops the gasoline flow to the engine.

According to refiners, a number of

obvious changes in design have been made, such as relocating fuel systems near the engine to prevent them from getting excessively hot. Another method used is to provide vents in carburetors; this, however, results in a waste of fuel.*

The American Petroleum Institute's procedure for making this type of test will be used, the cooperative committee announced. The results will be sent to a correlating committee, and will permit of comparison with tests of a similar character being made currently by automobile manufacturers.

The committee feels that a simple yardstick to measure the relative standings of fuel systems from model to model and from year to year would be of enormous value to fuel system designers.

The committee has reported that it plans to concentrate on several points in addition to the standard tests. Questions expected to be answered are:

1. Employing the present test method, how closely can an individual tester check himself and how closely can others check him as to the permissible vapor pressure fuels that any one car can handle?

2. Should fuel systems be rated solely on the basis of permissible vapor pressures or should the test method be such as to differentiate between cars

(Turn to page 174, please)

Business in Brief

Written by the Guaranty Trust Co., New York

There was a slight decline in general business activity last week. The weekly index compiled by the "Journal of Commerce" stood at 101.9, as compared with 102.2 for the preceding week and 93.4 for the corresponding week last year. Retail buying was estimated from 3 to 7 per cent higher than in the preceding week and 6 to 8 per cent larger than that in the corresponding period last year.

Secretary of Commerce Roper has recently stated that the fall outlook for business is good. He said that current conditions were satisfactory, with tourist business at an unprecedented level, crop prospects excellent, and a backlog of orders in many industries that will maintain operations well into the fall.

Car Loadings Maintained

Railway freight loadings during the week ended July 24 totaled 770,980 cars, which marks a gain of 905 cars above those in the preceding week, a rise of 39,999 cars above those a year ago, and an increase of 175,408 cars above those of two years ago.

Production of electricity by the electric

light and power industry in the United States during the week ended July 24 was 7.6 per cent above that in the corresponding period last year.

Lumber production during the week ended July 17 stood at 83 per cent of the 1929 weekly average. Output was 37 per cent above new orders and 12 per cent larger than shipments.

Average daily crude oil production for the week ended July 24 amounted to 3,576,400 barrels, as against 3,557,950 barrels for the preceding week and 2,960,950 barrels for the corresponding period last year.

Fisher Index Unchanged

Fisher's index of wholesale commodity prices for the week ended July 31 stood at 92.3, the same as for the preceding week, as compared with 92.5 two weeks ago.

The consolidated statement of the Federal Reserve banks for the week ended July 28 showed an increase of \$3,000,000 in holdings of discounted bills. Holdings of bills bought in the open market and of Government securities remained unchanged. Money in circulation declined \$12,000,000, and the monetary gold stock increased \$29,000,000.

Packard Motor Car Co. reported net income for the June quarter of \$1,208,355 or 8 cents a share, against \$2,272,099 or 15 cents a share in the 1936 period. For six months the net income equalled 25 cents a share against 23 cents last year.

Doehler Die Casting Co. has reported net earnings \$675,962, equal to \$2.41 a share on 280,426 shares of common after all charges including Federal taxes and contingencies, for first half 1937, compared with \$490,957 earnings in like period of 1936.

J. F. Koegler, president, said considerable portion of company income has been devoted to rebuilding of Pottstown, Pa., plant and lifting of \$80,000 mortgage on that property. Other plants also have been modernized.

Murray Ohio Mfg. Co.

6 mos. ended June 30

Net Income	\$98,516	\$182,317
Per share	92c	1.70

City Auto Stamping

6 mos. ended June 30

Net Income	\$245,069	\$306,125
Per share	65c	81c

General Motors Again Pays \$1

General Motors Corp. directors on Aug. 3 declared a dividend of \$1 a share on the common stock, the same as was declared for the preceding quarter of the year. The board also declared a regular quarterly preferred dividend of \$1.25 a share.

With this action, \$2.25 per common share will have been paid this year, but the February dividend of 25 cents a share, declared during the strike, was against earnings for the fourth quarter of 1936. Last week the company reported second quarter earnings of \$1.48 per common share and first half earnings of \$2.47. Comparison with 1936 statements showed \$2.00 and \$3.17 for the quarter and the half respectively in that year.

The common dividend just declared will be paid Sept. 13 to stock of record Aug. 12. The preferred dividend will be paid Nov. 1 to stock of record Oct. 4.

Air Traffic Rises

The 20 scheduled air lines operating in continental United States in June, 1937, carried 110,842 passengers, and flew 5,811,404 miles and 47,290,279 passenger miles according to reports to the bureau of air commerce, Department of Commerce. The lines carried 650,709 pounds of express and flew 377,223,690 express pound miles during the month. Sharp gains over preceding months were shown in all figures.

... slants

ECHO—No actual decline in automobile sales, private or commercial, is likely to occur over the next year at least, according to the British publication, "Investors Chronicle." The same view is held here, to judge from the comments and plans of manufacturers. The magazine, however, admitted that some slowing down of the rate of expansion is probable. It gives as the reason for the expectation of at least one more year of good business the rise of public income, allowing both initial and replacement purchases, and the steady rise of car values.

JOHN BULL VIEWS VANDERBILT RACE—Commenting on the foreign-tinged results of the recent Vanderbilt Cup Race at Roosevelt Raceways on Long Island, an observer for the



GEORGE J. MEAD, vice-president and chief engineer of the United Aircraft Corp., received an honorary degree of Doctor of Science from Trinity College, Hartford, Conn.

JOHN J. BORRUP has been appointed factory manager, and **DANIEL MacGREGOR JACK** general superintendent, by the Pratt & Whitney Aircraft division of the United Aircraft Corp. **CHARLES LAWSON** is taking Mr. Jack's post as machine shop superintendent on the day shift, and **G. H. D. MILLER** is to be assistant to the factory manager.

EDWARD F. WINTERGUST has been named official auto racing representative of the Gulf Oil Corporation. Announcement of Wintergust's appointment, to take effect at once, has been made by H. P. Hobart, general manager, lubricating oil sales.

COL. FRED L. DENNIS, director of safety of The Bendix Products Corporation, has been chosen to organize the Elks of America into a nation-wide drive to reduce automobile accidents.

J. E. LAMY has been appointed as organization manager of the Nash Motors division of Nash-Kelvinator Corporation. Mr. Lamy's appointment, said C. H. Bliss, vice-president, is a step in Nash Motors' program of expansion, which is being carried on intensively not only at the factories in Kenosha, Racine and Milwaukee, Wis., but in the selling organization in the field.

FRANK TIGHE formerly managing editor of *Motor Age*, Philadelphia, has joined the staff of Roche, Williams & Cunningham, Inc., of Chicago. Mr. Tighe will work in the news department of the agency, making his headquarters at South Bend, Ind., where he will concentrate on the Studebaker account.

STANLEY H. FRANKLIN is now resident engineer in charge of operations at the Bellevue, Ohio, plant of the Fleming Mfg. Co.

THOMAS R. A. BEVAN has been elected a vice-president of the Ethyl Export Corporation, foreign subsidiary of the Ethyl

Gasoline Corporation. Mr. Bevan will continue as manager of the London office of Ethyl Export, a post which he has occupied for the past ten years.

Farm Engineering School

To provide British farmers and their workers with theoretical and practical instruction in the use and care of modern power machinery, the Henry Ford Institute of Agricultural Engineering was opened recently at Boreham, Essex, adjoining the large Fordson Estate Farms near Chelmsford. The need for such an institute has been created by the spread of mechanization in British farming, with its consequent demand for new technical knowledge and skill on the part of farm workers.

Company Earnings

Hudson Motor Car Co. reported net income for the June quarter of \$1,056,241 against \$1,336,186 last year. For six months the net income was \$1,063,476 against \$1,840,355 last year.

Reo Motor Car Co. reported a net loss for the June quarter of \$147,745 against a net profit for the second quarter of 1936 of \$113. For the half year the net loss was \$417,240 against \$195,253 last year.

Murray Corp. of America reported June quarter net income of \$313,821 or 34 cents a share against \$682,769 or 73 cents a share a year earlier. For the half year the net income was equal to 72 cents a share against \$1.21 last year.

Willis Overland Motors, Inc., reported net income for the period Oct. 8, 1936, to May 31, 1937, of \$504,541 or 18 cents a share on the common stock after preferred dividends. The company was reorganized last year. There is no comparison.

Yellow Truck & Coach Mfg. Co. reported net income for the first half of 1936 of \$1,576,649, equal after regular preferred dividend provision only to 36 cents a share on the combined 2,999,989 shares of class A and B stock now outstanding. This compared with \$2,174,431 or 78 cents a share on 2,100,000 shares outstanding June 30, 1936. Sales for the period were \$37,981,161 against \$27,412,187 last year. The management said the drop in net income on the rise in sales was due to higher labor and material costs, social security taxes and lower efficiency of plant operatives, which were not offset by moderate price increases April 15. Comparison of statements indicated net income for the June quarter equal to 30 cents a share against 53 cents last year.

British magazine "Motor" says: "There now seems to be a scheme afoot to form an American syndicate to do something about this, and build better cars for their drivers. The Americans' driving showed that they are taking this road racing very seriously, and given the right cars, would be up amongst the best. Which is as it should be."

NOT ALWAYS TO THE SWIFT—In Havana recently a "minimum speed" race was held. The idea was to find out how slowly automobiles could cover a course of 547 yds. of straight asphalt road. Stalling meant disqualification. First and second places went to Ford "60s" with 57 min. 12 sec. and 56 min. 12 sec. to cover the ground. Only three other cars out of a total of 22 entries finished. Two of the three were Ford "85s".

Labor Turnover Up in June

Labor turnover was considerably higher in June in both the automobile and automobile parts industries, according to Department of Labor statistics. This reflected in part the beginning of the slow summer season and in part some plant labor troubles.

Total separation rate in the automobile and body field was 4.08 per 100 employees, against 3.39 in May and 4.51 in June, 1936, when the seasonal slowdown began a little earlier than this year. Accession rate was 2.51 against 3.09 in May and 3.08 a year ago. In the automobile parts field, the separation rate was 6.65 against 5.19 in May and 6.27 a year ago. Accession rate was 3.95 against 5.53 and 4.22 in June, 1936.

The automobile quit rate was 1.31 against 1.41 and 1.23 respectively, the discharge rate was 0.15 against 0.17 and 0.29, and the lay off rate was 2.62 against 1.81 in May and 2.99 in June last year. The automobile parts quit rate was 1.67 against 1.92 and 1.64 last year. The discharge rate was 0.29 against 0.35 and 0.37. The lay off rate was 4.69 against 2.92 and 4.26.

40 Years Ago

with the ancestors of
AUTOMOTIVE INDUSTRIES

The Other Side of the Case

Said a leading metropolitan newspaper recently apropos of the burning of the central power house at Washington, D. C.:

"The destruction of the power house which supplied the cable roads at Washington gives the horse a great opportunity to smile at those who were so certain that we are bearing down on a horseless age. If it were not for the horse the Washington people would be walking the streets today."

Promoters of the motor vehicle take quite a different view of the situation. They are thinking what an excellent opportunity it would be to introduce a line of motor stages in the capital city. The managers of the railroad are doubtless thinking the same thing, while they are compelled to go back temporarily to the old horse motor with all its inconvenience and expense.

—From *The Horseless Age*, August, 1897.

Automotive Industries

Automotive Metal Markets

Copper Price Outlook a Major Factor as Record Consumption Is Forecast; Some Chance Seen For Lower Tin Quotations

A statement has been made by the Copper and Brass Research Association that, with output of cars running 12 per cent over that of last year, the automobile industry will set a new record in the use of copper and its alloys this year. Estimating last year's consumption of copper by automobile manufacturers at 250,000,000 pounds, the association looks for a considerable addition to this tonnage this year.

The price trend of the red metal is thus brought into the foreground of automotive interest and a statement by a leading market authority that a decline in the price of copper, over both short and long term, is probable, has come in for wide attention. Barring the imponderable factors of a European war and monetary inflation here, this authority looks upon ample production in the United States as well as in other copper-producing countries as the outstanding reason for his expectation of a downtrend in prices. For the time being, however, the export price, which has been sufficiently higher than the domestic quotation to make buyers fearful of the possibility that the European arms situation may have its repercussion here in another advance, is the barometer that is watched more closely than any other development. Copper producers report July as having been the second best month of the year so far in point of demand.

From Singapore comes word that the tin producers of Malay, the world's most important tin-producing area, are tired of the restrictions placed upon them by the International Tin Control Agreement and are demanding complete freedom of action. The Straits Settlements government has recently lifted the ban on prospecting and new sources of supply are multiplying. The Malay producers contend that they are the only ones who could produce more tin than they are allowed to under the quota, none of the other producing countries coming anywhere near the quota set for them. The United States takes close to three-fourths of all the Straits tin produced and a lifting of present production restrictions would, so it is thought in the market here, tend to cut the American consumer's tin bill.

Aside from the fact that intimations of higher automobile prices by some of the leading motor car manufacturers imparted to the flat steel market an undertone of firmness, fresh developments in the steel situation are lacking. Conditions at all ends are more or less seasonal, with production rates maintained extraordinarily well in some of the districts, while in others shipments run sharply higher than incoming specifications.

Pig Iron—No definite announcement on fourth quarter prices is expected before Sept. 1, and continuance of prevailing levels is generally looked for. Fair-sized tonnages are moving to automotive foundries to provide material for late August and September melts.

Aluminum—Although buying by automotive consumers is still light, producers of secondary aluminum have raised their scrap buying prices by $\frac{1}{4}$ @ $\frac{1}{4}$ cent, indicating their need of material to prepare for better demand. Primary aluminum prices are unchanged.

Copper—The export price on Tuesday was up to 14½ cents, $\frac{1}{2}$ cent above the domestic price.

Tin—With London and Singapore closed on Monday because of the bank holiday, the market was slow getting under way. Spot Straits tin was quoted at 58½ cents @ 59 cents on Tuesday, up $\frac{1}{4}$ cent from Monday's nominal quotation.

Lead—Strong on heavy demand.

Zinc—Amid continuing paucity of Prime Western and Brass Special, the market is decidedly firm.

—W.C.H.

NSPA Elects New Members

The NSPA roster has passed 600, bringing the membership to the highest point in the association's history, as a result of the election of sixteen new members by the board of directors. Of the sixteen new firms awarded the emblem, nine are wholesalers, and seven manufacturers.

The complete list of new manufacturing members elected, together with the names of the executives who will represent their companies in association affairs follows:

Chicago Pneumatic Tool Company, New York City, T. P. Harris; The Electric Heat Control Company, Cleveland, Ohio, W. J. Bartlett; G. A. C. Manufacturing Company, Ashland, Ohio, Guy A. Countryman; Pratt Industries, Inc., Frankfort, New York, G. H. Sicard; Sight Feed Generator Company, West Alexandria, Ohio, C. F. Smith; The Torrington Company, Torrington, Connecticut, F. T. Case; Turnsignal Corporation, Philadelphia, Pa., H. O. Smith.

Holds Automotive Stocks

Report of the Lehman Corp., management type investment trust, for June 30, shows several large holdings of automotive securities. Among the common stocks held were 1000 shares of Briggs Mfg. Co. common stock, 10,000 shares of Campbell, Wyant & Cannon common, 6000 Chrysler Corp., 13,400 General Motors common, 13,000 B. F. Goodrich Co. common, 10,000 Goodyear Tire & Rubber Co. common and 10,000 United States Rubber Co. common. The trust also held 28,500 shares of International Harvester Co. common.

Aircraft holdings, in addition to stocks of some transport lines, included 8000 Curtiss-Wright Corp. class A, 5000 Consolidated Aircraft and 19,400 United Aircraft Corp.

H. H. Linn

Holman H. Linn, vice-president in charge of engineering of Linn Mfg. Co., died recently at the age of sixty.

August 7, 1937

New Truck Registrations

	June 1937	May 1937	June 1936	Six Months		Per Cent Change 6 Months 1937 over 1936	Per Cent of Total Six Months	
				1937	1936		1937	1936
Ford.....	17,780	20,452	16,930	114,952	96,394	+ 19.2	33.60	30.07
Chevrolet.....	17,179	20,772	19,045	100,125	113,424	- 11.6	29.27	35.39
International.....	6,925	7,279	6,151	38,418	34,666	+ 10.8	11.23	10.82
Dodge.....	6,191	6,045	7,777	31,631	43,615	- 27.5	9.25	13.61
G. M. C.....	4,146	4,536	2,820	23,569	11,335	+108.0	6.89	3.54
Plymouth.....	1,696	1,506	324	6,475	1,514	+327.0	1.89	.47
Diamond T.....	685	867	660	4,782	3,837	+ 24.6	1.40	1.20
White.....	521	684	464	3,279	2,631	+ 24.7	.96	.82
Studebaker.....	651	720	320	2,965	1,503	+ 97.1	.87	.47
Mack.....	540	588	427	2,955	1,537	+ 92.2	.86	.48
Terraplane.....	565	509	262	2,783	1,015	+174.0	.81	.32
Reo.....	454	424	325	2,438	1,923	+ 25.7	.71	.60
Federal.....	226	301	287	1,439	1,431	.....	.42	.45
Autocar.....	199	198	96	1,046	546	+ 91.5	.31	.17
Brockway.....	139	183	137	863	793	+ 9.0	.25	.25
Indiana.....	157	111	135	810	785	+ 6.0	.24	.24
Stewart.....	94	120	113	677	561	+ 20.7	.20	.17
Divco.....	113	183	117	669	572	+ 16.9	.20	.16
Willys-Overland.....	82	77	239	524	1,142	- 54.2	.15	.38
Stutz Pak-Age-Car.....	81	60	.....	337	.....	.....	.10	.....
F. W. D.....	32	70	24	258	194	+ 33.0	.08	.06
Sterling.....	33	28	28	186	94	+ 98.0	.05	.03
Kenworth.....	14	10	.....	72	.....	.....	.02	.....
Schacht.....	2	4	.....	34	.....	.....	.01	.....
Miscellaneous.....	143	130	170	797	987	- 19.2	.23	.30
Total.....	58,628	65,857	56,851	342,084	320,479	+ 7.0	100.00	100.00

Vapor-Locking

(Continued from page 171)

of different vapor-wasting capacities?

3. What is the magnitude of the losses incurred through the venting of vapors at the carburetor bowl in various cars?

4. The present vapor-lock road test procedure uses a correction factor to convert permissible vapor pressures at the test temperature to terms of permissible vapor pressure at a standard temperature of 100 deg. F. How valid is this correction factor?

5. How long does it take to run a reliable vapor pressure requirement on a car using the present tentative test method? Is it possible to modify the test so that more reliable information could be gained in less time without the need for specially trained observers? Is it possible to modify the tests so that results constitute a truer test of cars? Do standard reference fuels of different characteristics than those employed at present give any promise of simplifying the procedure and improving the results?

Special equipment has already been developed to seek the answers. One device, a multipoint potentiometer, determines the temperatures at different points along the fuel system of cars under test. Laboratory equipment has been installed in the field stations along the route of the road tests.

Members of the steering committee of the Natural Gasoline Association of America and the Western Petroleum Refiners Association are:

T. W. Legatski, Philips Petroleum Co., Bartlesville, Okla., chairman; E. C. LeFevre, Empire Oil & Refining Co., Bartlesville, Okla.; C. R. Williams, Continental Oil Co., Pompa City, representing the NGAA; J. D. Brazier, Barnsdall Refining Co., Barnsdall,

Okla.; W. W. Scheumann, Empire Oil & Refining Co., Tulsa, Okla., and F. A. Deering, Kanotex Refining Co., Arkansas City, Kan., representing WPRA.

Riot, Strike at Plymouth

(Continued from page 167)

from the plant two non-members of their union and with threatening to beat them.

Richard T. Frankenstein, organization director for the UAW, issued a statement charging the corporation with favoring "two-bit unions to the extent that they have refused to recognize frequent flagrant violations of our agreement committed by these men." Frankenstein asked that the four discharged men be returned to their jobs and that the company submit to a voluntary election conducted by the NLRB "to prove not only to the Chrysler Corp. but to the general public that the statement of the so-called Chrysler independent unions that they have 26,000 members is just so much hooey."

The Plymouth plant remained closed on Aug. 5 as corporation officials conferred with UAW leaders. It was expected that departments of the Dodge division of the corporation, which manufactures Plymouth parts, and also that Briggs Mfg. Co. would be affected by the Plymouth shutdown.

Buick Fight Broadcast

Buick has signed a contract with NBC to broadcast the next world's heavyweight championship fight between Joe Louis and Tommy Farr at Yankee Stadium, N. Y., on Aug. 26. As was the case in the recent Louis-Braddock battle at Chicago, the Flint motor manufacturer probably will command the entire facilities of both NBC chains. This is the fourth broadcast of a major heavyweight ring event sponsored by Buick during the past three years.

GM Probe Continues

FTC Hears Chicago Group On Parts Sale Complaint

After a two-day session at Detroit last week, during which the testimony of sales and other officials of the General Motors Corporation and the General Motors Sales Corporation and their various subsidiaries was taken, the Federal Trade Commission on July 29 opened a six-day hearing in Chicago on its complaint charging the two corporations named with unfair competition and practices tending to create a monopoly in the sale of automobile parts, accessories and supplies.

During the Chicago hearing, a large number of General Motors ex-dealers who had lost their franchises, were examined, and questioned especially as to the reasons for their losing the franchises. John L. Hornor was the presiding examiner, and E. F. Haycraft and D. P. MacDonald acted as attorneys for the Federal Trade Commission. The respondents were represented by Albert M. Levert, associate of John Thomas Smith, New York attorney.

Following is the hearing schedule:

Milwaukee, Wisc., Aug. 9, 1937, Rm. 322, Post Office Bldg., 10 a.m. C.S.T.—3 days.
Oshkosh, Wis., Aug. 12, 1937, Rm. 213, Post Office Bldg., 10 a.m., C.S.T.—2 days.
Minneapolis, Minn., Aug. 16, 1937, Rm. 307, Federal Bldg., 10 a.m., C.S.T.—2 days.
Des Moines, Ia., Aug. 18, 1937, Rm. 316, Federal Bldg., 10 a.m., C.S.T.—1 day.
Kansas City, Mo., Aug. 19, 1937, Rm. 320, Old P.O. Bldg., 10 a.m., C.S.T.—3 days.
Amarillo, Texas, Aug. 23, 1937, Rm. 327, Federal Bldg., 10 a.m., C.S.T.—1 day.
Dallas, Texas, Aug. 25, 1937, Rm. 330, Federal Bldg., 10 a.m., C.S.T.—1 day.
Houston, Texas, Aug. 27, 1937, 9th Court Room, Federal Bldg., 10 a.m., C.S.T.—1 day.
New York, N. Y., Sept. 1, 1937, Rm. 500, 45 Broadway, 9 a.m., E.S.T.—3 days.
Springfield, Mass., Sept. 7, 1937, Rm. 336, Federal Bldg., 9 a.m., D.S.T.—2 days.
Albany, N. Y., Sept. 9, 1937, Rm. 410, Federal Bldg., 9 a.m., E.S.T.—2 days.
Cleveland, Ohio, Sept. 13, 1937, Rm. 424, Federal Bldg., 10 a.m., E.S.T.—1 or 2 days.
Pittsburgh, Pa., Sept. 15, 1937, Court Room No. 4, Main Post Office Bldg., 9 a.m., E.S.T.—1 or 2 days.



Working Drawings have been prepared by the Society of Automotive Engineers Standards Committee from which a machine may be constructed to test vee-belts by methods given in the 1937 SAE handbook, pp. 60-63. Complete sets of these drawings are available to SAE members at 50 cents; to non-members at \$1.

Two bulletins, HD-537 and MU-637, describing "Hevi Duty" laboratory furnaces made by the Hevi Duty Electric Co., are available.*

The Bristol Co. of Waterbury has issued a bulletin on telemetering and remote control by means of the company's Metameter. The bulletin is No. 490.*

A catalog on air conditioning equipment produced by the Continental Motors Corp. has been issued.*

August 7, 1937

Automotive Industries

Anaconda Wire & Cable Co. has issued a new 20 page booklet describing its non-metallic sheathed cable for direct burial in the ground. The publication is designated C-27.*

A revised edition of the Hobart Arc Welding Manual and Operators' Training Course is available.

Leeds & Northrup Co. has just published a discussion of plant temperature instruments of which the company makes four types. The booklet is in considerable detail.*

The Abrasive Co. has issued two new bulletins on the subject of nut-inserted discs for disc and surface grinding and grinding wheels or general purpose grinding.*

A circular describing Ingersoll "Ray blade cutters" has been published. It includes use data.*

Wheelco Instruments Co. has published a new bulletin on their new model 1101 "Flame-otrol," a gas burner safety device.

International Nickel Co.'s "Nickel Cast Iron Data" has appeared as Section 1, No. 6, on alloyed cast irons in petroleum refining equipment.*

* Obtainable from editorial department, AUTOMOTIVE INDUSTRIES. Address Chestnut and 56th Sts., Philadelphia.

Mail Order Tire Prices Up

Mail order tire and tube prices have been advanced from 6 to 10 per cent by both Montgomery Ward and Sears Roebuck in their fall-winter catalogs now being issued to several million customers throughout the United States. The new prices are effective immediately. Both of these firms are marketing higher grade tires in their stores than they list in their catalogs, and are holding store prices well within range of the price levels being maintained by tire manufacturers and dealers. Mont-

gomery Ward has a de luxe first line casing which it actually lists at 25 per cent higher than standard first line prices of the industry.

In addition to elevating prices in line with the industry's earlier price move upward, both mail order houses made significant changes in their tire guarantees. Both have completely eliminated features of their guarantees providing adjustments for tire failure caused by any or all road hazards. Tire industry leaders hail this as a significant move. Last February independent manufacturers abandoned the road hazard tire guarantee. Standard Oil stations are still giving the guarantee on "Atlas" tires but hopes are entertained that Standard Oil may soon fall in line. It is understood that since its inception in 1931 the road hazard guarantee has cost the tire industry more than \$50,000,000 in unfair tire adjustments.

Car Legislation Assailed

A pointed exchange of views on legislation in the retail automobile business between State Senator G. Erle Ingram of Wisconsin and Gordon L. Hostetter, executive director, Employers' Association of Chicago, highlighted the mid-summer convention of the Automotive Trade Association. Managers held in Chicago, Aug. 4-6.

Senator Ingram after hearing Hostetter denounce the present trend of legislation in Washington and elsewhere as being a viru-

lent form of collectivism, stated that while he did not think Pennsylvania's used car price fixing act was the answer, he did think that Wisconsin was on the right road with the legislation it has passed during the past year and a half.

Taking exception to Hostetter's criticism of legislation under the present administration as placing government in the hands of a favored and all-wise few, Ingram stated that industry as a whole had brought the condition upon itself with its do-nothing, fight-everything attitude.

Referring to Pennsylvania's licensing and price-fixing law, Ingram stated that the outstanding weakness in it, assuming that it is constitutional, is that you cannot set a flat appraisal figure for a used car that will hold up all over one city, let alone an entire state. There will always be, he said, a difference of from \$40-\$50 on a given model of used car between dealers, and no legislation can change that fundamental fact. Far better, he said, is it for the individual dealer to determine what he can allow for a used car and make a profit.

Bendix-NLRB Decisions Due

The National Labor Relations Board will give two important labor relations decisions within the next ten days as a result of hearings on Bendix union eligibility recently concluded. One is on the question whether plant police and clerical workers shall have the right to belong to the union, the other whether the results of the check up of union membership against plant payroll justifies the making of Bendix union No. 9 the sole bargaining agent for the corporation without an NLRB poll taken in the plant.

Autocar Net Rises

The Autocar Co. reported net income for the six months ended June 30 of \$288,880, against net income of \$37,089 for the like portion of 1936.

Calendar of Coming Events

SHOWS

- Second Winter Item Show, Automobile Accessories Association, Chicago, Aug. 9
- Poland, Automobile Salon (Foire Orientale), LwowSept. 1-15
- Yugoslavia, Automobile Section, Autumn Fair, LjubljanaSept. 1-12
- Yugoslavia, Automobile Section, Commercial Fair, Belgrade.....Sept. 11-21
- France, 31st International Automobile Salon, ParisOct. 7-17
- Great Britain, 31st International Automobile Exposition, London....Oct. 14-23
- Czechoslovakian Automobile Show, Prague.....Oct. 16-24
- National Automobile Show, New York, Oct. 27-Nov. 3
- Toledo, O., Automobile Show..Oct. 27-Nov. 3
- Italy, 10th International Automobile Salon, MilanOct. 28-Nov. 8
- Boston, Mass., Automobile Show, Oct. 30-Nov. 6
- Los Angeles, Cal., Automobile Show, Oct. 30-Nov. 7
- San Francisco, Automobile Show, Oct. 30-Nov. 7
- Cincinnati Automobile Show.Oct. 31-Nov. 6
- Great Britain, 13th International Commercial Automobile Exposition (trucks and buses), London...Nov. 4-13
- Chicago Automobile Show.....Nov. 6-13
- Akron Automobile Show.....Nov. 6-12
- Omaha Automobile Show.....Nov. 6-11
- Brooklyn Automobile Show.....Nov. 6-13
- Columbus Automobile ShowNov. 6-12
- Detroit Automobile Show.....Nov. 6-13
- Motor Truck Show, 4th Annual, Newark, N. J.Nov. 6-12
- Newark, N. J., Truck Show.....Nov. 6-12
- Buffalo, N. Y., Automobile Show..Nov. 6-13
- Indianapolis, Automobile Show....Nov. 6-13

Show Business

Manager of the National Automobile Show in New York is Alfred Reeves, 366 Madison Ave., N. Y. C. Inquiries concerning all matters connected with the national show should be addressed to him. AUTOMOTIVE INDUSTRIES will be pleased to furnish names and addresses of local show managers on request.

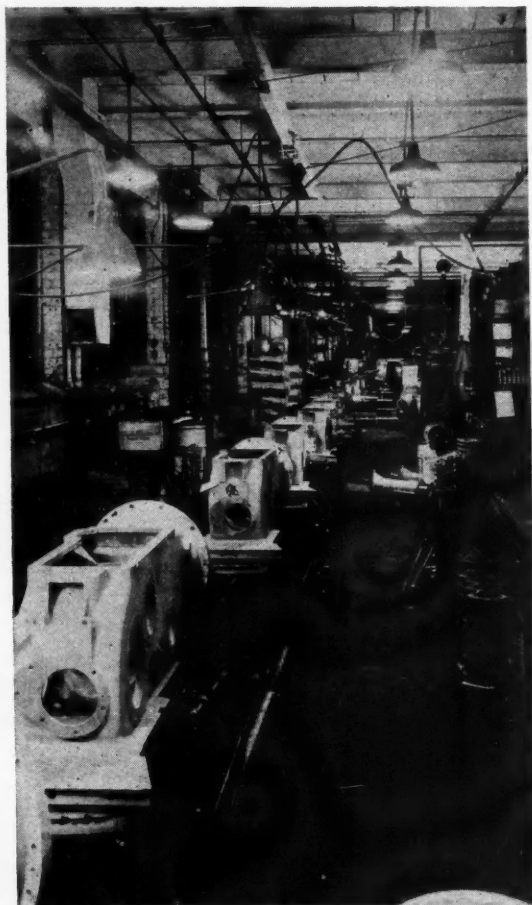
- Newark, N. J., Automobile Show..Nov. 6-13
- Philadelphia Automobile Show....Nov. 6-13
- Pittsburgh, Pa., Automobile Show.Nov. 6-13
- Toronto, Ont., Automobile Show..Nov. 6-13
- Great Britain, 36th Scottish International Automobile Exposition, GlasgowNov. 12-20
- Baltimore, Md., Automobile Show, Nov. 13-20
- Cleveland, Ohio, Automobile Show, Nov. 13-20
- Jersey City, N. J., Automobile Show, Nov. 15-20
- Milwaukee, Wis., Automobile Show, Nov. 17-24
- Springfield, Mass., Automobile Show, Nov. 14-20
- St. Louis, Mo., Automobile Show.Nov. 14-21
- Portland, Ore., Automobile Show.Nov. 14-21
- Denver, Colo., Automobile Show, Nov. 15-20
- Montreal, Que., Automobile Show, Nov. 20-27
- Kansas City, Mo., Automobile Show, Nov. 27-Dec. 4
- A.S.I. Show, Navy Pier, Chicago, Dec. 6-Dec. 11

CONTESTS

- National and International Soap Box Derby Finals, Akron, Ohio.....Aug. 15
- Pan American Cup Race, Roosevelt RacewaySept. 6
- National Outboard Championship Regattas, Richmond, Va.....Sept. 18-19

CONVENTIONS AND MEETINGS

- U.A.W. Annual Convention, Milwaukee, Aug. 23
- American Chemical Society, Rochester, N. Y.Sept. 6-10
- International Congress on Carbohydrate Carburants, RomeSept. 10-12
- S.A.E. Section Regional Tractor Meeting, Akron, Ohio.....Sept. 15-17
- American Transit Association, 56th Annual Convention, White Sulphur Springs, W. Va.....Sept. 19-23
- S.A.E. Section Regional Transportation Meeting, ChicagoSept. 29-Oct. 1
- American Foundrymen's Association Midyear Meeting, Columbus, Ohio, Sept. 30-Oct. 1
- S.A.E. Fuels and Lubricants Regional Meeting, Tulsa, Okla.Sept. 30-Oct. 1
- S.A.E. National Aircraft Production Meeting, Los Angeles, Calif.....Oct. 7-9
- American Foundrymen's Association, Regional Conference, Rolla, Mo., Oct. 8-9
- National Battery Manufacturers Assn., ChicagoOct. 10-12
- National Metal Congress, Atlantic City, Oct. 18-22
- S.A.E. Annual Dinner, Commodore Hotel, New York.....Oct. 28
- American Petroleum Institute, 18th Annual Meeting, Stevens Hotel, ChicagoNov. 8-12
- S.A.E. National Production Meeting, Flint, Mich.Dec. 8-10



Looking up the new "Z" tractor line assembly. It all starts with the transmission case in the foreground, progressively picks up other parts and assemblies, emerging as a complete tractor at the far end in the background

Production Setup at Minneapolis-Moline Promotes Flexibility

By JOSEPH GESCHELIN

IN launching its new line of Model Z tractors, the Minneapolis-Moline Power Implement Co., Minneapolis, Minn., brought to the fore a very novel type of power plant. This engine, Model RE, first described in *AUTOMOTIVE INDUSTRIES*, July 17, was designed specifically for farm service with special attention to the details of ready accessibility, ease of maintenance, and serviceability.

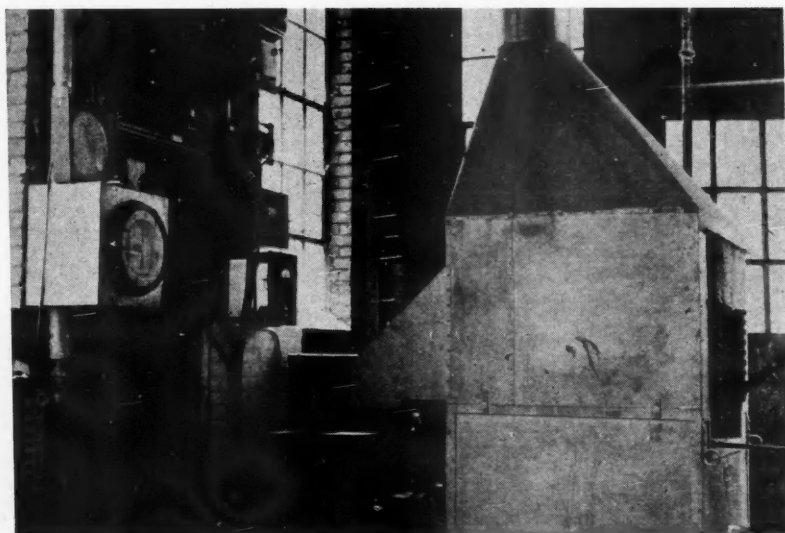
Advance news of this development with its consequent changes in the factory setup impelled us to study the operation at first hand. Because of the splendid cooperation of the plant management and particularly W. C. MacFarlane, president of the company, we are able to present to our readers a very interesting account of their production thinking and planning.

For the benefit of those who are not familiar with the activities of this organization, we may preface the discussion by pointing out that the company produces a varied line of power imple-

ments, including tractors classed as standard, universal, and orchard types. In addition, they build a line of power units and a variety of sizes of engines. The latter includes a group of low-speed, heavy-duty engines which are said to be the largest of their kind made in this country and enjoy a good volume of demand both in this country and abroad. These are six-cylinder engines made in three sizes—7¼x9, 7¾x9, and

8x9 in., with a rating ranging 138 to 170 horsepower, maximum, when using gasoline and high compression heads.

When plans were made early this spring to launch the new line of tractors and engines, the plant management was energized into an unusual activity, for this was a signal opportunity to modernize the manufacturing facilities and procedures. The final result was a general revamping of departments,



View of newly installed Ajax electric heat treating furnace using liquid carburizing bath. Note automatic recording controls on wall at left

THIS IS THE SEVENTEENTH IN THE SERIES OF MONTHLY PRODUCTION FEATURES.

the installation of new assembly lines, installation of many items of modern production equipment, simplification of materials-handling by improvement in layout and flow of materials.

Inasmuch as the New Day tractor was responsible for the changes made here, the burden of the discussion in this article is concerned principally with the production of the new line, although some reference is made to other parts.

It may be said in general that the manufacturing set-up at Minneapolis-Moline is quite representative of many

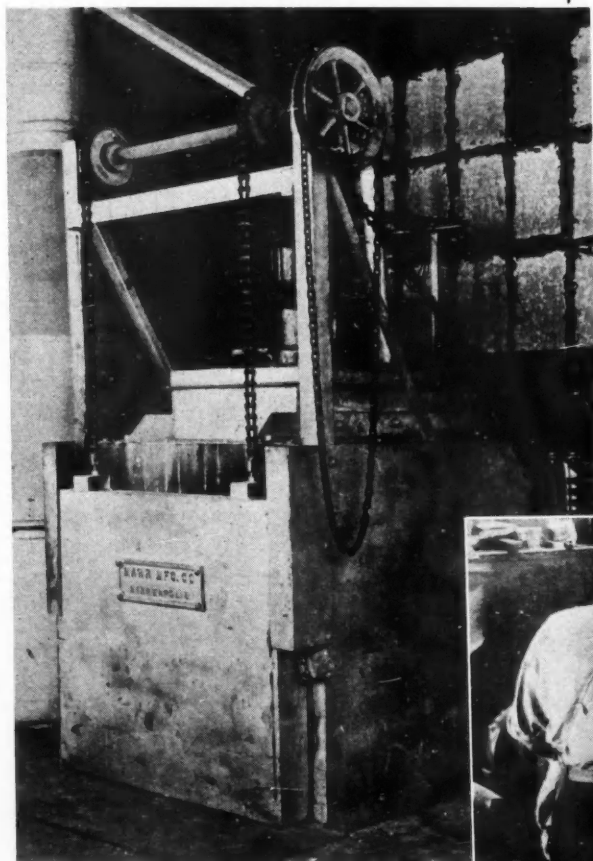
plants in the automotive industry where the product is built to high quality levels but in relatively low volume, at least as compared with mass-production

plants. Despite the moderate volume, the operation demands modernity in management methods and in manufacturing equipment due to the need for building a quality product at reasonable costs compatible with the competitive situation.

Flexibility may be set down at once as the motivating principle in every phase of this operation. The trained observer will find many logical differ-

Factory Executive Personnel

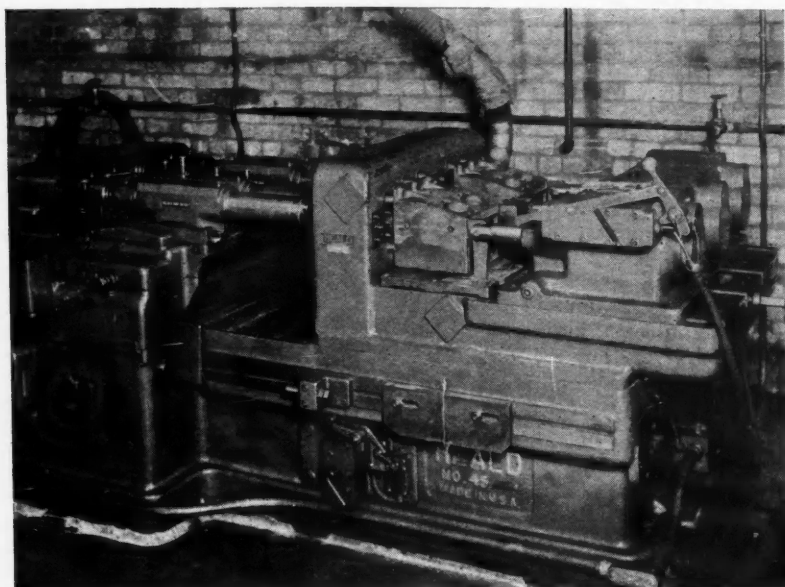
W. C. MacFarlane	President
E. L. Hoffman	Mechanical Superintendent
Jack Crawford	General Foreman
S. O. Gustafson	Erection Foreman
Herbert Larson	Foundry Superintendent
A. W. Warford	Plant Engineer
Russel Anderson	Time Study
Oscar Pederson	Production Supervisor
Victor Hoffman	General Foreman & Repair Division Maintenance
Sam Kinkle	Sheet Metal General Foreman
Matthew Thelan	Final Inspector
Ralph Bowman	Metallurgist
K. A. Powell	Research Engineer
A. W. Lavers	Chief Engineer, Tractor Division



(Above) Gas-fired, drawing furnace made by Mahr Mfg. Co., Minneapolis, is a feature of the heat-treat department equipment

(Right) Part of battery of Landis grinders, the one in the foreground being set up for crankshaft grinding



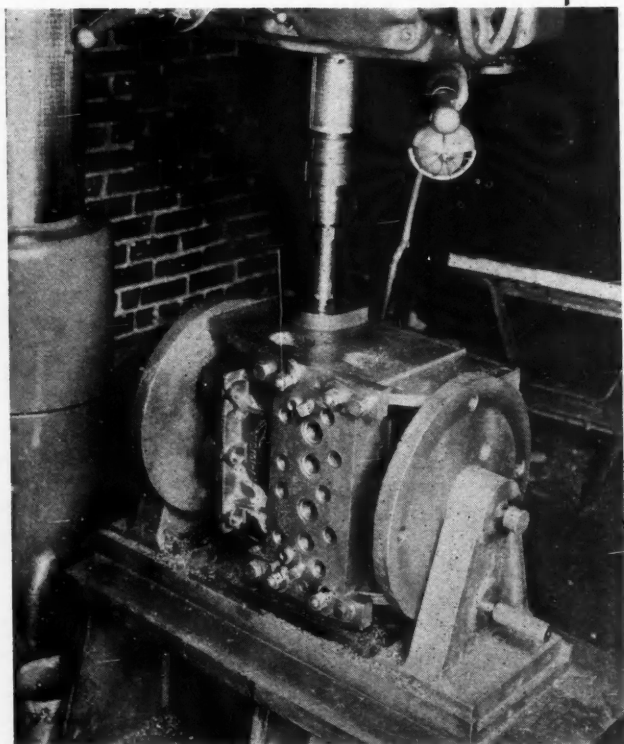


Heald, four-spindle, precision boring machine with single-point cemented carbide fly-cutters is used for finish-boring all M-M engine cylinders, although it was installed primarily as a part of the "RE" engine program. The precision boring spindles are on adjustable centers to accommodate a variety of bore spacing

the greater variety of parts flowing through the same machine.

Quite fittingly, therefore, we find

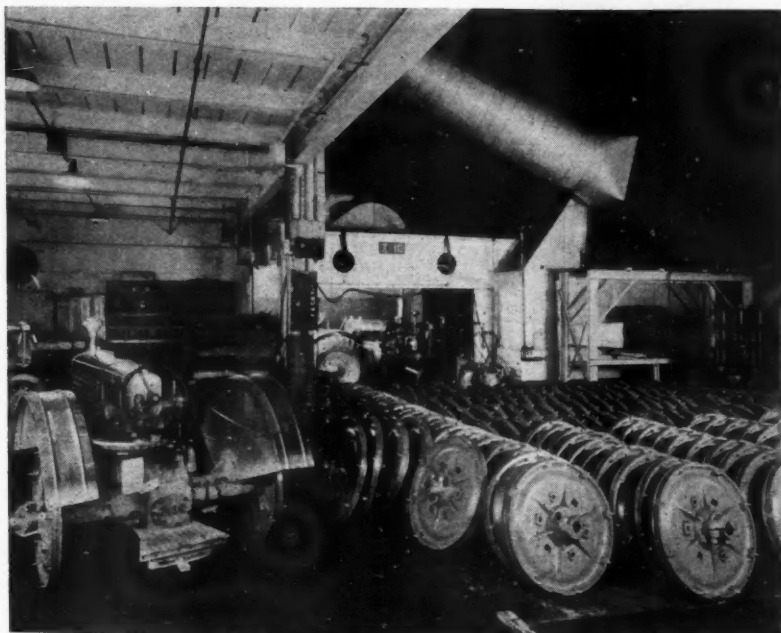
ences from the practice in mass-production plants. For one thing, the flow of work is quite different where moderate volume is the rule. Perhaps the biggest difference lies in the utilization of more skilled and trained mechanics and as we go further into this discussion, it will become obvious that a better type of mechanic (rather than machine tender) is required for the operation of the universal types of machine tools and



Factory Routing RE Connecting Rod

OPERATION	EQUIPMENT
Anneal	
Sandblast	
Straddle mill sides for grind	Duplex milling machine
Split rod and cap	Cincinnati milling machine
Mill rod end and step fit	Cincinnati milling machine
Mill step fit and locating pads on cap	Cincinnati milling machine
Drill rod and cap	Natco Multiple drill press
Countersink and tap rod	Barnes Post drill press
Spotface cap	Barnes Post drill press
File burrs, wash and assemble rod and cap	Bench
Center small end	Barnes Post drill press
Rough and finish bore and chamfer	Ingersoll boring machine
Drill 5/32 in. hole in small end	Barnes Post drill press
Press in pin bushing	Bench
Ream small end	Barnes Post drill press
Burnish in bushing	Bench
Disassemble and mill slot in rod and assemble	Cincinnati hand milling machine
Finish grind both sides	Blanchard disc grinder
Finish grind large hole	Heald Gagematic grinder

Close-up of one of the Carlton radial drills on the new engine line. This set-up is for various drilling operations on the cylinder block top and sides. Note the universal trunnion-type fixture which facilitates drilling on all faces of the block



At the end of the final assembly line. Background shows the new De-Vilbiss double, spray booth for painting the "Z" tractor. Machines move through this station on a floor conveyor

that all work is departmentalized by segregating similar types of equipment and manning each department with operators having training in the use of such equipment. Thus instead of the straight line production which characterizes the large volume plant, the parts are routed from one department to the next until all operations have been completed. The principal advantage of this arrangement is that it makes possible the routing of all parts for the gamut of engines, transmissions, and other elements, through the same departments, and frequently over the same machine tools. Similarly, the skilled mechanics acquire the facility to handle this variety of work on the same machine with changes in fixtures and tooling wherever necessary for a new set-up.

The only exception to the foregoing generalization is in respect to the new tractor line. Sufficient volume is expected to justify the installation of a special line of machinery which is used, in the main, almost exclusively for the new parts, although even some of this equipment has been spread around in the various departments rather than aligned for straight-line production.

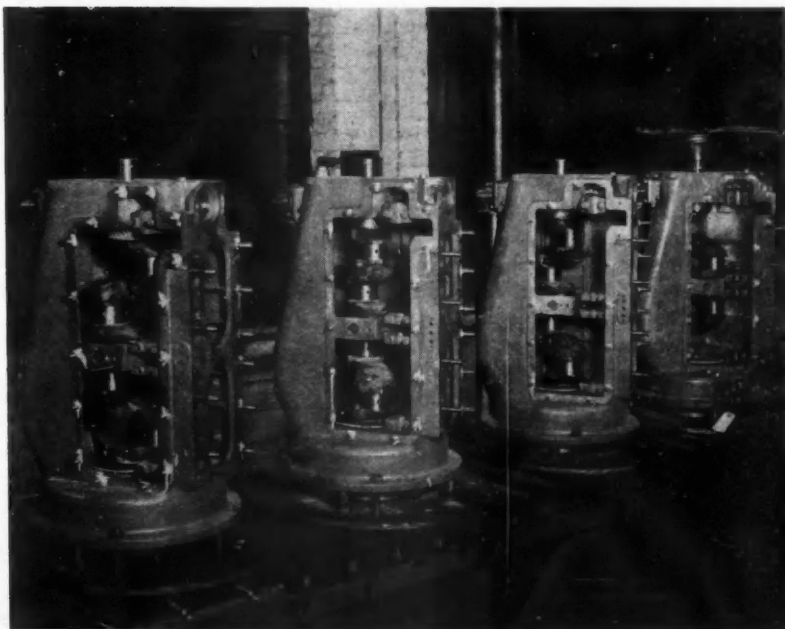
There is a dynamic quality incident to any modernization program that

stimulates the thinking of plant engineers at a time when the management is most receptive to new ideas and reasonable budgets for their execution. This element is very evident here. For example, the introduction of new equipment made possible the adoption of individual motor drives for new items and changeover to individual drive on many items of the older equipment. In addition, it has been possible to take advantage of new developments such as the use of totally enclosed, fan-ventilated motors for all foundry equipment and

in the machine shops wherever cast iron is cut.

Greater flexibility is being achieved by the use of the modern overhead power duct lines with outlets at frequent intervals to permit plugging-in of machine connections. This is in line with current practice in most automotive plants and makes possible the rapid and economical shifting of machines at will either in the same department or into entirely different parts of the plant.

Equipment policy naturally is dictated by the nature of the operation. In this respect, good judgment has been exercised in selecting new items of equipment which are of universal or unit-type depending upon their specific duty. This type of equipment when tooled economically lends itself not only to seasonal changes in product design but to frequent changes so as to accommodate a variety of different parts at various times. Consistent with this principle, they have developed universal types of jigs and fixtures which can accommodate different products over the same machine; also some special fixtures designed for specific parts but fitting the machine bed so as to be readily interchanged.



Close-up of "RE" engine assembly line showing method of moving blocks upended for detail assembly operations. The heavy-duty gravity roller conveyor was installed specifically for this job



Ingersoll fixed rail milling machine set up to mill complete all faces of the "RE" crankcase. Note that the fixture takes the cases in pairs so that each part is completed in two settings. Rough and finish-cut milling cutters may be plainly seen at the head

While on the subject of tooling, we should like to comment on the fact that the management has found it most economical to permit the machine tool builder to design and supply certain types of tooling on special set-ups. The practical reason for this is that wherever a new machine has been selected for a guaranteed rate of production, it is good business for both the supplier and user to concentrate the responsibility for the guaranteed rate by permitting the tool builder to coordinate both the machine and its tooling according to his own experience.

Carlton radial drills are used here for the majority of drilling and tapping set-ups, in preference to multiple-drilling machines, due to the flexibility of the radial drill in job-lot production and the ability to switch rapidly from one type of work to another. Flexibility is facilitated by the use of roll-over fixtures which enable the operator to reach all sides of a large casting. Interchangeable roll-over fixtures are available for different types of work on the same machine.

Since everyone concerned with plant management follows equipment practice very closely, it may be noted that much of the new machinery is of advanced type and quite similar to the equipment found in high production plants. To illustrate this statement without anticipating later discussion, we might mention just a few of the high spots.

One of the most interesting items is the four-spindle, horizontal, Heald precision boring machine which is used for single-point boring of the RE engine cylinder bores. This machine is

of the same design as the one used at Cadillac for boring V-8 cylinder blocks.

A number of the unit-type Ingersoll machines with individual Power-Pack heads, similar to the equipment in many Detroit plants, will be found here. Barber-Colman has contributed one of its latest taper spline hobbing machines, producing the type of fastening which is gaining acceptance as the preferred

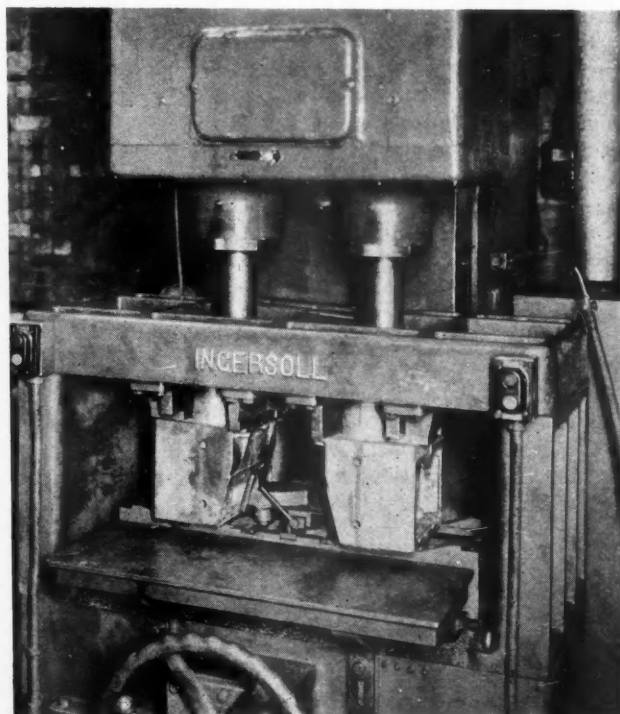
method wherever heavy loads and shocks are anticipated.

Then as will be noted on the factory routings, there are the new Gould & Eberhardt hobbors of various types; Cincinnati milling machines; Landis grinders; Fellows gear shapers; Natco multiple drills; Bullard turret lathes filling an entire department; Gisholt and Warner & Swasey turret lathes; a huge National Acme screw machine department; Sundstrand stub lathes; and many others.

Great skill and ingenuity are evident in the development of small tools used in the present set-up. Nothing has been overlooked in taking advantage of the latest developments. For example, depending upon the job, they use cemented-carbides, Stellite J-Metal, high-speed-steel, etc. In fact, they have several intricate tool set-ups where all of the tool materials mentioned above are used.

It is a general practice in this plant to use multiple tool set-ups on boring, milling, and turret machines, dividing the cut between roughing and finishing tools. Thus a boring bar may have two

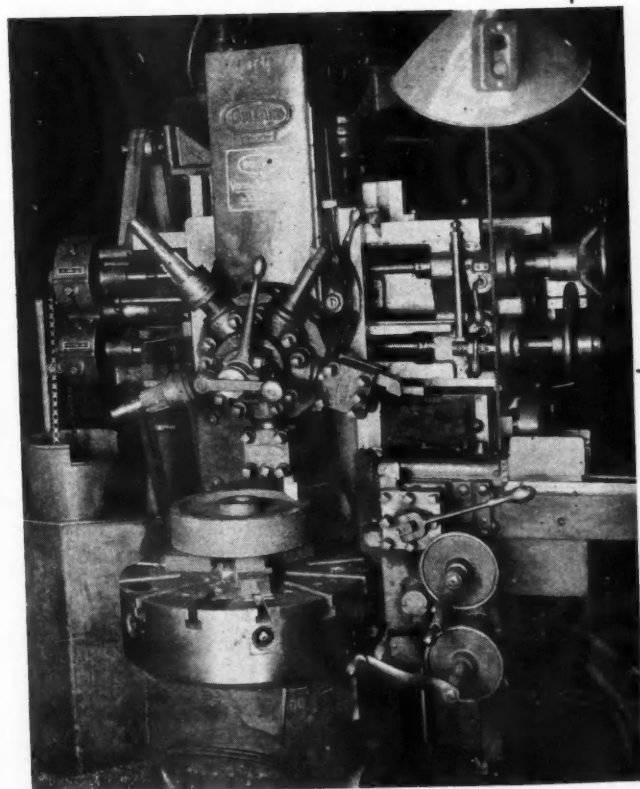
Two - spindle Ingersoll boring machine is used for rough-boring cylinder bores. Each block has two bores, bored one at a time as shown, with two blocks in the fixture





Cylinder blocks and heads are handled in sets on this Newton Rotary milling machine fitted with suitable table. It handles top and two sides of each part, rough- and finish-grinding in one cycle, using two sets of milling cutters which may be plainly seen in the background

sets of fly-cutters, one taking the first cut, the other finishing; a turret lathe may have two sets of box tools—rough-



The flywheel department is all Bullard — featuring a battery of 12 Bullard lathes. The one shown here is a new model recently installed

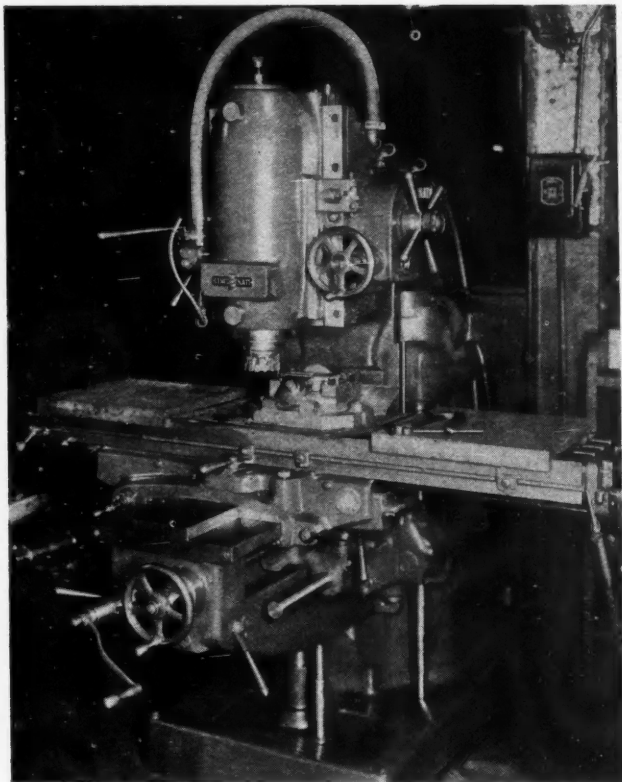
Factory Routing RE Crankshaft

OPERATION	EQUIPMENT
Rough drill and center large end	Barnes post drill press
Turn center and end bearing	LeBlond engine lathe
Turn large end bearing	LeBlond engine lathe
Rough grind pins	Landis grinder
Grind center bearing	Landis grinder
Grind pins	Landis grinder
Grind end bearings	Landis grinder
Grind small end	Landis grinder
Drill oil holes	Leland Gifford drilling machine
Turn and cut groove on large end	LeBlond engine lathe
Bore large end	LeBlond engine lathe
Cut-off small end and re-center	LeBlond engine lathe
Mill 2 No. 11 keyways on small end	Cincinnati hand milling machine
Mill other No. 11 keyway	Cincinnati hand milling machine
Drill 2— $\frac{1}{4}$ in. holes and set screw hole	Barnes post drill press
Cut spline	Barber-Colman spline hober
Thread	Lees - Bradner thread miller
Balance	Tinius Olson balancing machine
Polish	Engine lathe

ing tools coming in first, followed by the finishing tools.

One set-up in particular, on the boring of both ends of the RE connecting rods, uses the Packard reamer on the boring bar for the small end. This is the unique, thin flat-sided cutter patented by Packard Motor Car Co., and first described in *AUTOMOTIVE INDUSTRIES* Aug. 15, 1936.

The tractor division comprises the



Cincinnati vertical mill is one of the new items of equipment in the milling machine department. This operation is milling the boss for the Purolator bracket

produced in this article. In addition, there is a rather comprehensive pictorial section showing interesting and new items of equipment in various departments.

While the foregoing will carry the burden of the story, there are many high spots well worth mentioning at this point.

Consider the final assembly lines. With the introduction of the new Z tractor, it was necessary to install several modern assembly lines—one for engine assembly, the other for tractor assembly. The pictorial section shows both lines in action. On the engine line, the assembly is made with the

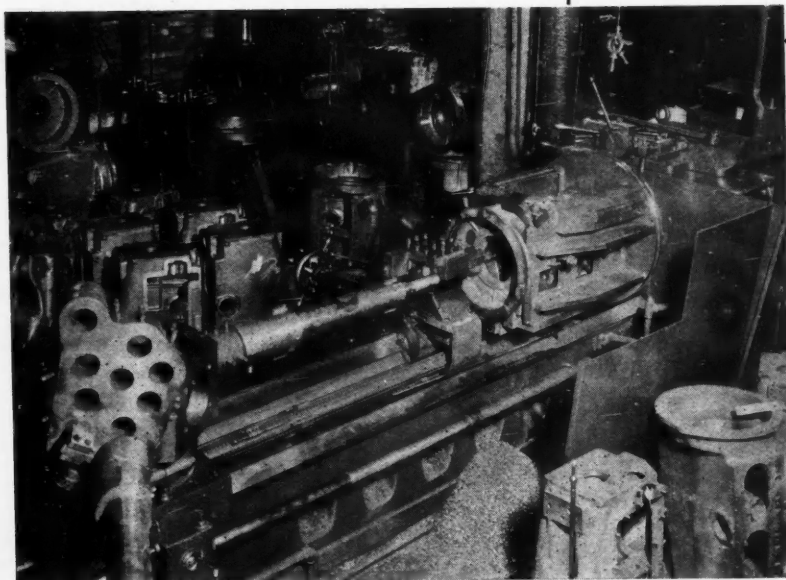
following factory departments:

Foundry	Heat Treat
Sheet Metal	Drill Press
Grinding	"R" Motor Line
Milling Machine	Chucking Machine
Screw Machine	Engine Assembly
Gear Cutting	Tractor Assembly
	Flywheel

PLANT DETAILS—So far as the actual production operations go, we shall rely upon the details in the factory routings on RE engine parts re-

Factory Routing Third and Fourth Speed Pinion

OPERATION	EQUIPMENT
Saw off	Marvel hack saw
Anneal	
Rattle	
Drill, ream, counterbore and face large gear	Warner & Swasey turret lathe
Broach	Oilgear broaching machine
Finish turn and face complete	Fay automatic lathe
Broach to remove burrs	Oilgear broaching machine
Cut teeth	Fellows gear shaper and Gould & Eberhardt hobbing machine
Chamfer teeth	Cross tooth rounder
Carburize and harden	



crankcase set on end in the fixture to facilitate handling. The conveyor is of the gravity roll type but is of heavy-duty construction with anti-friction bearing rollers.

Assembly operations on the engine line are facilitated by a new installa-

Unusual tooling set-up on big Warner & Swasey turret lathe. This handles the "RE" crankcase, boring for main bearings with long bars, and counterboring bell housing end



Battery of two new 10 in. automatic Sundstrand Stub lathes set up for turning gear blanks

tion of Black & Decker high-cycle portable tools of every variety. Completed engines are routed to the block test before they are transported to the final line.

Final assembly starts with the transmission case and continues through the initial stages of gear box assembly which, in combination with the engine, forms the backbone of the frameless tractor chassis. As the case moves along the line, it meets other units stored or sub-assembled at the side of the line in true automotive fashion. There are stations for the engine, rear axle, front axle, wheels, sheet metal, etc., culminating in a complete tractor at the end of the line.

Tractors come off the line under their own power and immediately enter a large spray booth whose principal axis is at right angles to the final assembly line. A floor conveyor chain has been provided for moving the machines through this station. The spray booth is of latest design built by DeVilbiss and features water-wash over-spray back.

The screw machine department is equipped entirely with National Acme machines, including a new Model R- $\frac{3}{4}$ in. four-spindle machine, fitted with the

Blanchard Pulsator for automatic lubrication.

Flywheels for all engines are machined in a Bullard department comprising a battery of 12 universal-type Bullard vertical turret lathes of which one is new and of the latest type. Adjacent to the Bullard equipment is a Gisholt vertical flywheel balancing machine which permits the completion of principal flywheel operations at this point.

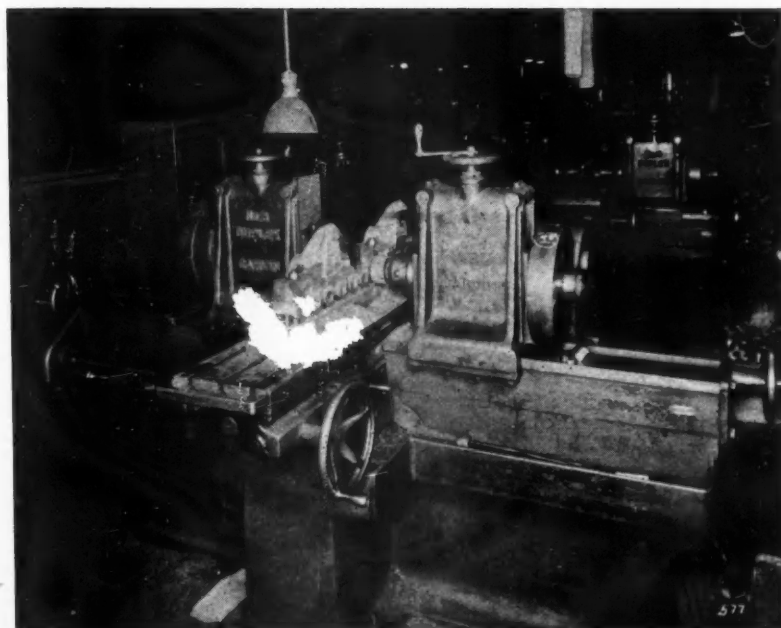
The grinding department has a variety of universal type equipment to

facilitate the handling of grinding for the entire line of product. There is a Landis plain grinder for all manner of center work. A new Cincinnati centerless grinder is used for shafts of every description. Another Landis grinder is set up for crankshaft work. An interesting variation here is the rough-grinding of pins on the small RE crankshaft directly from the rough forging, thus eliminating the usual pin-turning operations.

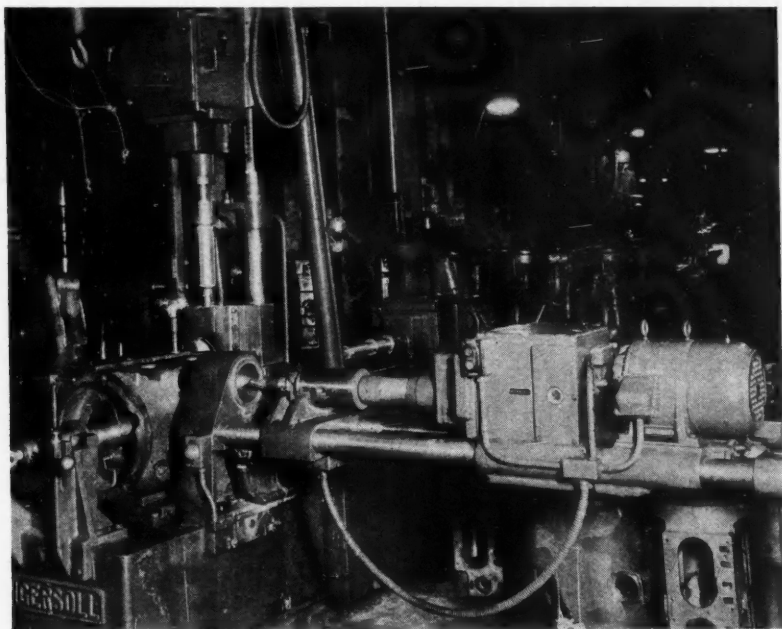
Many miscellaneous operations are performed in various parts of the plant. For instance, there is a new multiple spindle Natco drill which is used for general purposes. A Warner & Swasey turret lathe fitted with quickly replaceable chucking jaws is used for all manner of chucking work. In the same department will be found a Gisholt turret lathe fitted with an air-operated chuck used almost exclusively for bevel ring gear machining.

Two new Sundstrand Stub Lathes are set up for specific operations. One of these—a 10 in. lathe—is used for pinion and shaft turning; the other with a shorter bed is used for gear blanking.

The milling machine department comprises a variety of standard universal-type machines, including some of the old double-end DeVlieg millers still doing yeoman duty. An interesting set-up in this department is a Cincinnati mill machining rocker arm bosses.



The old Garvin Duplex milling machines are still doing yeoman duty here. This is part of a battery of machines in the milling department. The operation is milling bosses on intake and exhaust manifolds



Boring camshaft bearings, governor mounting, and oil pump bore on this three-way, three-head Ingersoll boring machine. This is typical of the unit-type Power-Pack equipment installed here for the new engine

has been widely adopted in many of the large automotive plants.

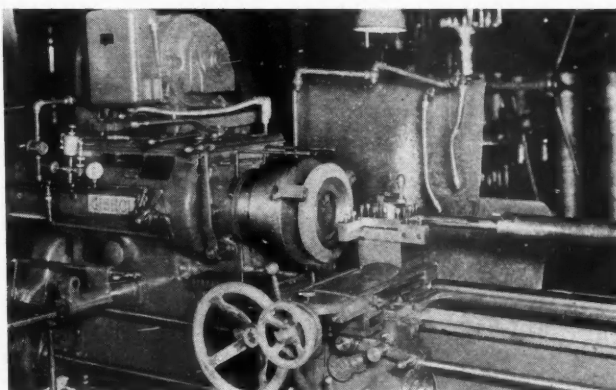
One of the major problems in the heat treat is the development of techniques for preventing gear distortion in the fire. Perhaps the most troublesome part to control is a cluster gear where there is a large change in section between large and small diameters. At the present time they follow a procedure that appears to give excellent results. This

It takes the bosses at both ends, two pieces at a time.

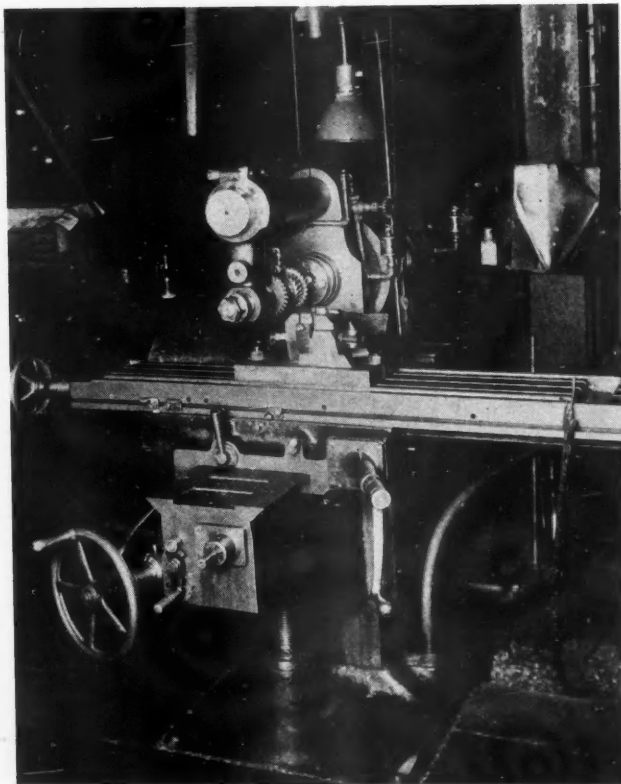
The gear department, manned by specialists, is provided with many items of gear cutting equipment suitable for the job-lot production of a variety of small and very large gears. Here will be found the familiar Gleason generators, Fellows gear shapers, Barber-Colman hobbers, including a new B-C spline hobbing machine. They also have installed a battery of new Gould & Eberhardt vertical hobbing machines. Of these, one is the manufacturing type machine for spur gears, fitted with a flywheel on the end of the spindle. One of the large Gould & Eberhardt hobbers is being used for cutting ring gears, taking four at a time, another of these machines is set up for cutting metal timing gears.

The routing of the "third and fourth speed pinion cluster" is an example of the manner in which such parts are handled. It must be remembered that the work goes through various specialized departments before and after work in the gear shop.

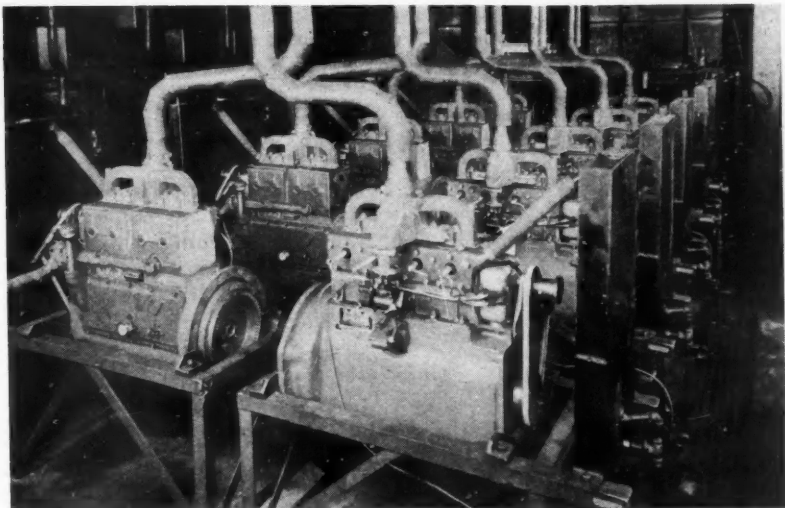
Heat treat is provided with adequate equipment for handling all of the parts requiring carburizing, annealing, and other heat-treating functions. Several new pieces of equipment will be found here. One is an interesting gas-fired drawing furnace made by the Mahr Mfg. Co., a Minneapolis concern specializing in furnaces and ovens of various kinds. Another is the Ajax electric furnace fitted with Leeds & Northrup thermostatic control. This unit is being used for liquid case carburizing processes and eventually will utilize the Houghton Perliton liquid bath which



(Above) Heavy-duty Gisholt turret lathe with cross-side tooling is set up for turning ring gear blanks



(Right) Cincinnati milling machine with multiple cutter set-up for milling steps in connecting rod caps



All "RE" engines are run-in under their own power. This is a view of one of the blocks of test stands used for various types of M-M engines

consists in pressing a hard metal plug into the small diameter bore, tending to expand the bore initially and then permitting the bore to shrink to size after cooling.

A rather tricky job, and one which is quite off the beaten path, is the fabrication of wheel rims for tractor wheels. This is done in the structural erection shop. Tractor wheels grow pretty large—ranging from 26 to 52 in. in diameter and from 5 to 15 in. in width. The first step is to punch the blank and holes for

spoke attachment for the correct developed length and width to produce the final formed rim. The next step is to roll the blank into hoop form, after which the joint is welded by the electric arc using General Electric and Lincoln portable welders.

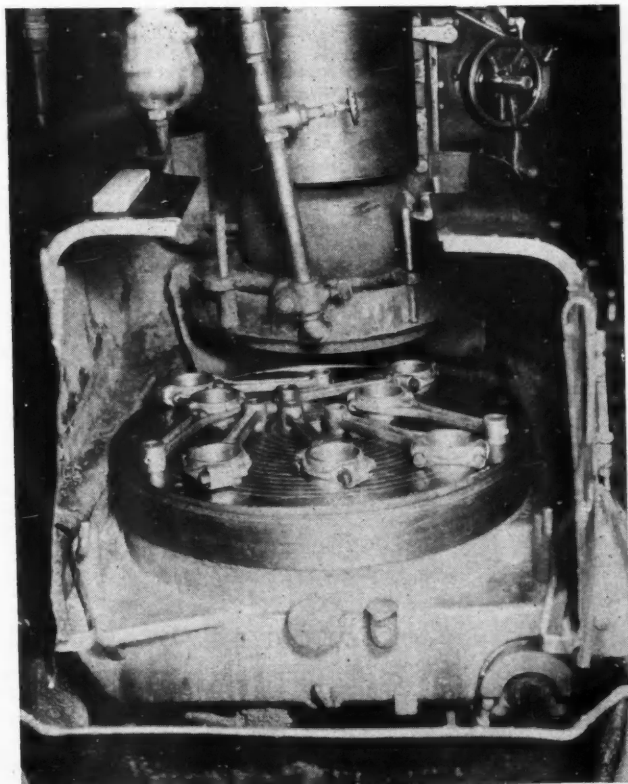
The final step, and easily the most difficult, is the formation of the rim contour to produce various sections including side flanges. This is accom-

plished in one setting on a huge Williams-White forming machine.

One of the major activities in this plant is the gray iron foundry which produces all of the cast iron parts used in M-M tractor production, many of the castings exceeding both in size and weight anything that is used in general automotive manufacture. The foundry, too, is being modernized bit by bit and at the present time features many outstanding items of equipment.

In modernizing the core room, they have installed the first machine of what will be a battery of International core blowers, eventually extending the technique of core blowing to many different elements. Another interesting piece of equipment is the Mahr Mfg. Co. gas-fired continuous drying oven for cores.

Much of the back-breaking effort usually associated with foundry work has been eliminated by the installation of mechanical handling equipment and mechanical molding machines. Perhaps the biggest burden has been removed from the molding of huge engine crank-



Factory Routing RE Crankcase

OPERATION	EQUIPMENT
Mill complete	Ingersoll fixed rail milling machine
Drill and tap top, bottom and sides	Carlton radial drill press
Bore for main bearing and counterbore bell end	Warner & Swasey turret lathe
Bore, cam, pump and governor holes	Ingersoll 3-way boring machine
Drill and tap both ends	Carlton radial drill press
Drill and tap for oil pump and governor housing	Carlton radial drill press

Blanchard vertical disc grinder with magnetic chuck is used for finish-grinding both bearing sides of "RE" connecting rods



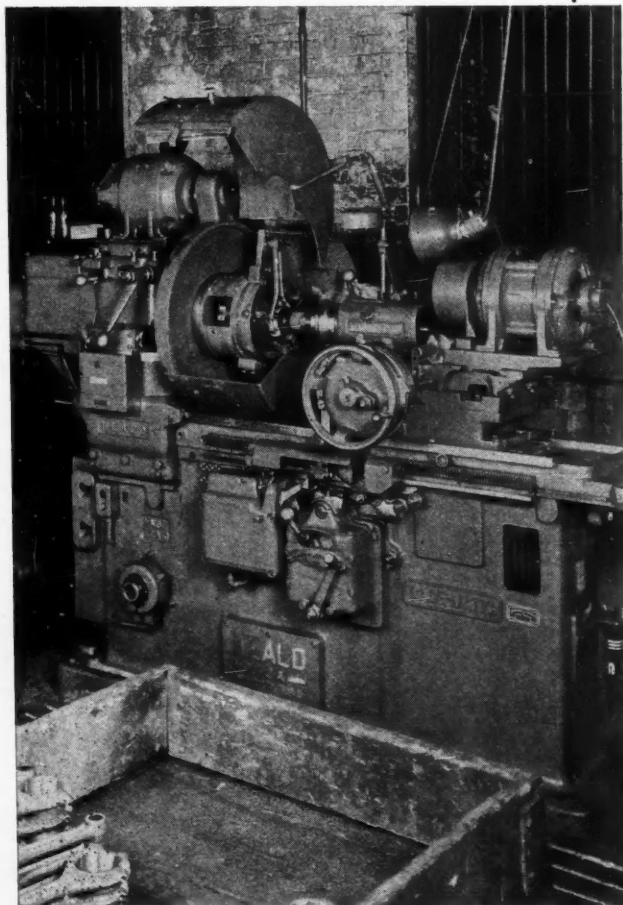
Close-up on "Z" assembly line showing assembly operations at the early stages of transmission case assembly

cases. For this purpose they have installed a battery of two Osborn jolt, roll-over, molding machines, one at each end of the crankcase molding floor. One takes the cope; the other the drag. Each machine is served by one of two new Cleveland Tramrail systems to handle the flask, patterns, and molds. Each Tramrail unit is provided with a special six-point control station which enables the crane operator to move and inch the crane to the veriest fraction of its travel in any direction.

Having followed through a general perspective of the plant and its various departments, we shall devote some attention to the major parts of the new RE engine. This discussion will serve to expand to some extent on the details given in the factory routings.

Factory Routing RE Cylinder and Head

OPERATION	EQUIPMENT
Mill top and two sides	Newton rotary milling machine
Mill bottom	Cincinnati milling machine
Drill, spotface, and tap top and bottom	Carlton radial drill press
Drill and tap four sides	Carlton radial drill press
Rough bore	Ingersoll two-spindle boring machine
Finish bore and chamfer skirt end	Barnes Post drill press Heald precision boring machine
Ream, bore, face, and counterbore for valves	Natco multiple drilling machine
Drive and spin in inserts	Barnes Post drill press
Assemble expansion plugs	
Water test	



Heald Gage-Matic grinder is used for finish-grinding bore in connecting rod big end

CONNECTING ROD—The routing is quite conventional except for the new Ingersoll boring machine set-up, illustrated in the pictorial section. In this operation, both ends of the rod are
(Turn to page 194, please)

Just Among Ourselves

What Does the Silence Mean?

SEVERAL weeks ago the name John L. Lewis wove in and out of important headlines in newspapers all over the United States. Currently, Lewis seems to have retired to that mountain cave where the noises of the rude world don't penetrate, and the usual media of publicity are inoperative. A. F. of L. and C. I. O. unions are at each other's necks over questions of jurisdiction in Philadelphia and elsewhere, but the mighty name of Lewis is not conspicuously invoked in the disputes. To paraphrase the old proverb: Lewis's speech may be silver to his followers, but his silence is golden to a lot of manufacturers who are thereby enabled to get some business done. But what does the silence mean?

Frank Dissemination And Propaganda

RECENT labor disturbances have resulted in an overhauling of labor-relations and public-relations policies by some of the manufacturers in the industry. In some cases it has meant the assignment of top executives to specialized responsibility on labor questions; in others specialists have been brought in from outside. Anyhow, there is a stronger tendency to realize that labor and public

relations are specialized jobs requiring specialized training, unless some executive of the corporation happens to be especially gifted in these directions.

With this fact floating around in the background, we were struck by a re-definition of publicity and propaganda and public relations, which comes from the pen of Luther K. Bell, who gets paid for cogitating upon such problems.

Says Mr. Bell: "Publicity may be defined as the frank dissemination of a point of view or the facts affecting a given situation. Propaganda may be defined as the attempted manipulation through means not wholly frank, of human impressions and opinions."

Or, to put it another way, he says, "Publicity is mechanism, while propaganda is motive," and "this brings us to the third term—public relations—which is both mechanism and motive."

These distinctions seem of outstanding importance to an editor. Certainly they are becoming of increasing importance to everyone else, with our environment crisscrossed by conflicting claims.

Comptrollers Should Appreciate Figures

EVERY manufacturing executive these days necessarily knows something of cost accounting, but apparently the converse is not true. In a recent letter, R.

E. W. Harrison, of Chambersburg, says: "My experience in selling highly productive machine tools indicates that a major element of sales resistance comes from the accountancy end of the customer concern because of lack of appreciation on the part of the comptroller of the true value of modern equipment as against the relatively low earning capacity of old equipment."

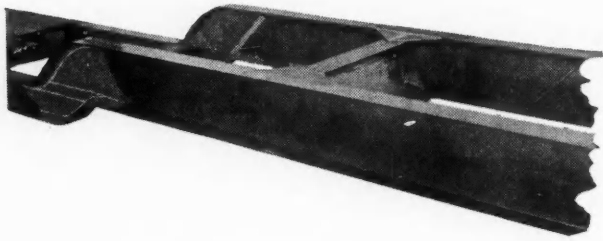
"The automotive industry," he continues, "shares with the airplane industry, the deserved reputation for alertness to the possibilities of good equipment. However, such resistance as does exist comes almost invariably from the accountants."

Automatic Shifts "Going to Town"

PRESENT interest in automatic transmissions will probably culminate in the appearance of such devices on six or seven of the 1938 cars. Because of the interest in the subject, suppliers in the field have hastened to buy up likely devices for development, in order to maintain their competitive position. There is a possibility also, that a new factor may enter the transmission-control field with an electrical mechanism which we have driven to our entire satisfaction, but which has not previously been developed commercially.

A good many people in the industry seem to feel that the development of several successful remote-control shifts and automatic transmissions may bring the rear-engined car a step nearer, if the rear-engined car becomes desirable from other points of view.—H.H.

Arc welded trailer frame showing construction details.



Trailers Fabricated by Advanced Methods

THAT electric welding has proved advantageous in the manufacture of trailers, is indicated by results obtained by the Utility Trailer Co., Los Angeles. During 10 years study of arc welded design and construction as applied to their products, this company has developed a design which is very efficient, combining maximum strength with minimum weight and capable of being built with considerable economy as regards weight, cost and time of construction. The company reports that the application of electric welding has enabled them to reduce weight 10 to 15 per cent while still obtaining equal strength, to reduce cost 28 to 30 per cent, to increase service life, to meet more effectively requirements for special frame details, to reduce the number of structural parts, to obtain improved appearance and to more easily repair a trailer in case of accident. In addition to the foregoing, the company reports that its present procedure with arc welding accounts for a 30 per cent reduction in trailer construction time. These advantages of arc welding have been recorded from data covering 4000 trailers which the company has produced by arc welding since 1928.

In changing its products over from design for the previous method of construction to electric welding, the Utility Trailer Co. made the transition gradually. They did not immediately produce an all welded trailer design. Their adoption of the new process was accomplished a step at a time, that is, the beginning was made with small parts of a chassis frame and having changed these over for welded construction, the redesign was successively applied until the all welded design was achieved. The value in this method of changing a product from one method of construction to another is

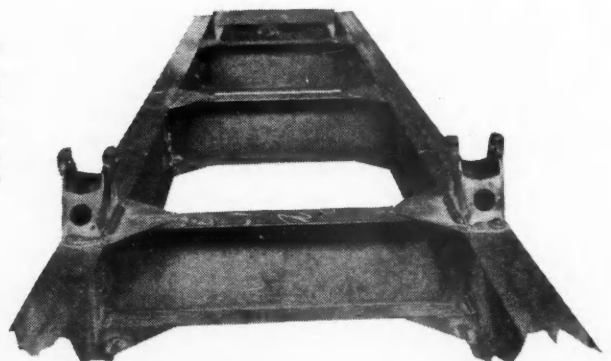
evidenced in the obtainment of the manufacturing advantages previously referred to.

The very interesting frame design used in the company's trailer is illustrated herewith. The side frame members of this unit consist of 6-in. 12-lb. light "I" beams and 10-in. 11½-lb. joist "I" beams. The cross members of the frame are 6-in. structural channels and 10-in. formed channels, both of which are ¼ in. thick. The cross members and side members of the frame are joined together by fillet welds. To obtain maximum fatigue resistance, each gusset plate where cross frame members connect with the side members is in reality composed of two triangles. Where the triangles rest on

the cross member they are separated and the welding is done across the base of each triangle joining it to the side frame member and then along the open space which separates the two, so that the welding bead provides complete fusion of the gusset plate with the cross members the entire distance from the side member of the peak of the angle.

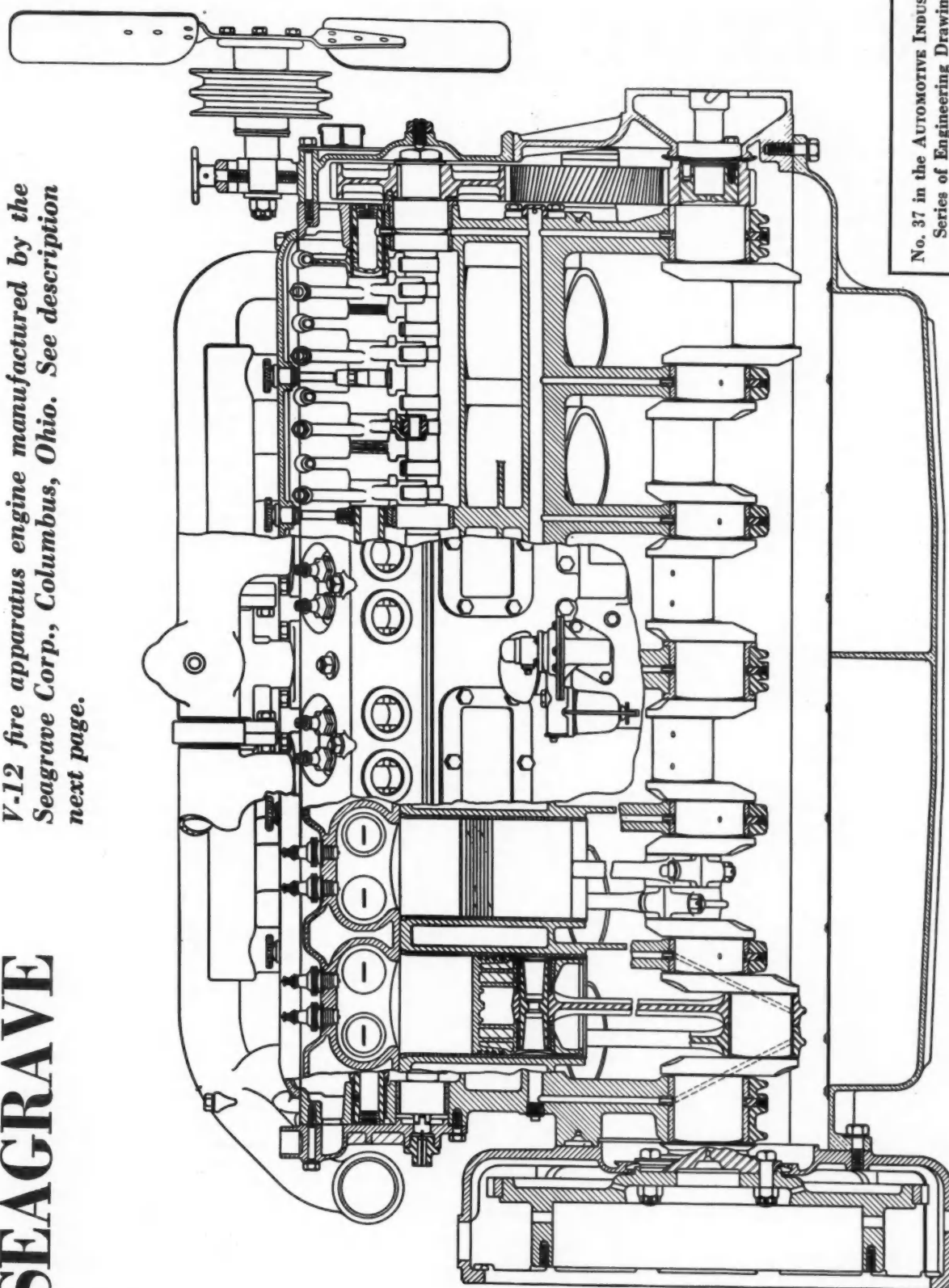
The steel used in the trailer frame is a low carbon steel with a yield point of 45,000 to 55,000 lb. per sq. in. The weight of the frame is approximately 1500 lb. and requires approximately 12 lb of weld metal. "Fleetweld" electrodes and "Shield-Arc" welders, manufactured by the Lincoln Electric Co., are used.

Design of all arc welded steel trailer frame, developed during ten years' experience at the Utility Trailer Company, Los Angeles, California.



SEAGRAVE

V-12 fire apparatus engine manufactured by the Seagrave Corp., Columbus, Ohio. See description next page.



No. 37 in the AUTOMOTIVE INDUSTRIES
Series of Engineering Drawings

SEAGRAVE

This 45-deg. vee type, heavy-duty gasoline engine develops 240 hp. at 2400 r.p.m. Compression ratio is 5.5 to 1. Bore and stroke are $4\frac{1}{2}$ in. by $4\frac{3}{4}$ in., making the piston displacement 906.5 cu. in. There are seven main bearings with a projected area totaling 43.75 sq. in. Connecting rod bearings, of the steel reinforced lead bronze interchangeable type, have a total projected area of 42.3 sq. in. Cylinders are cast integral with the crankcase and have removable chrome nickel iron sleeves. Pistons are cast iron and carry four rings, three compression and one oil, all above piston pins.

Cylinder heads are cast in units of six and are interchangeable from one cylinder bank to the other. They may be removed without dis-

turbing the cam shaft or valve rocker shaft. Valves, of Sil-chrome steel, are located side by side and in a plane at right angles to the cylinder center line. They are inserted through ports which are closed by threaded aluminum plugs.

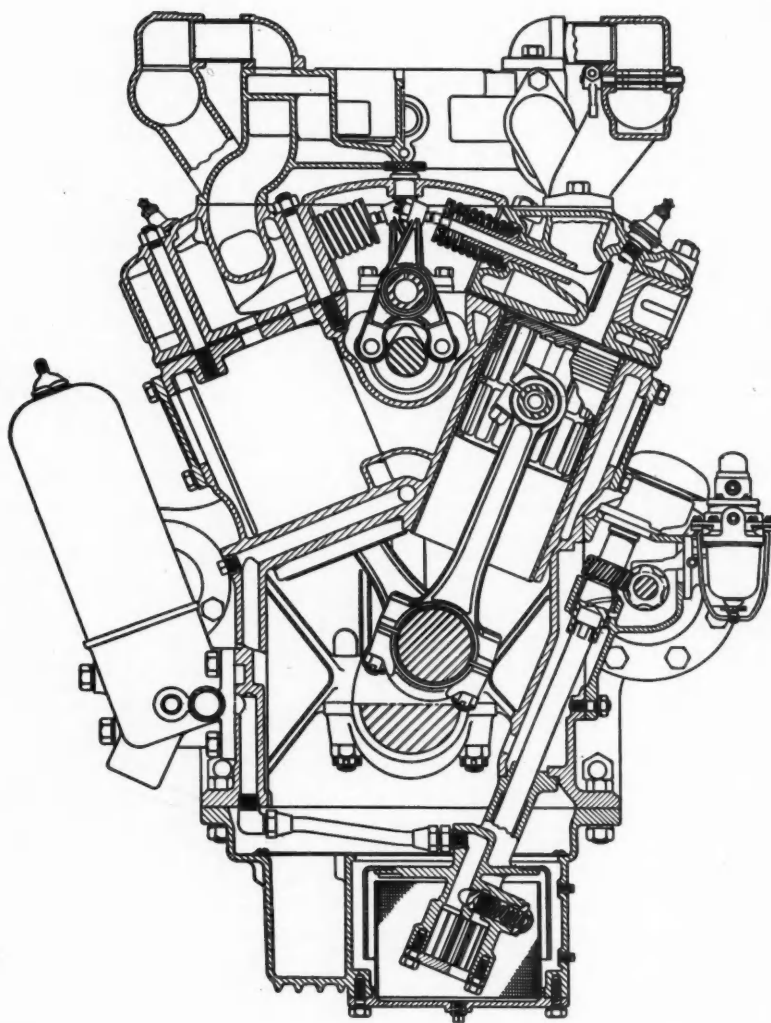
Each bank of cylinders is provided with its own intake and exhaust system. The intake manifolds are joined at the center by a header through which each is fed by one side of a dual type down draft carburetor. The portion of the header immediately below the carburetor is jacketed and a controllable volume of exhaust gases may be diverted through the jacket for vaporizing the fuel. Fuel is supplied by a mechanical pump operated by a cam on the oil pump drive shaft.

The single camshaft, supported by four bearings and driven by helical gears, operates partially submerged in a bath of oil in a trough between the two cylinder banks.

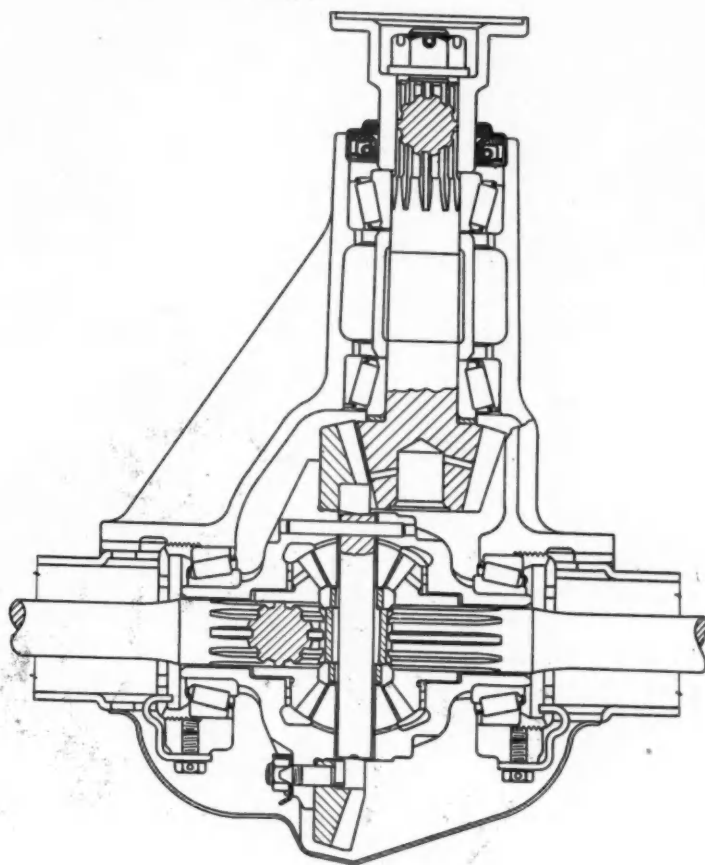
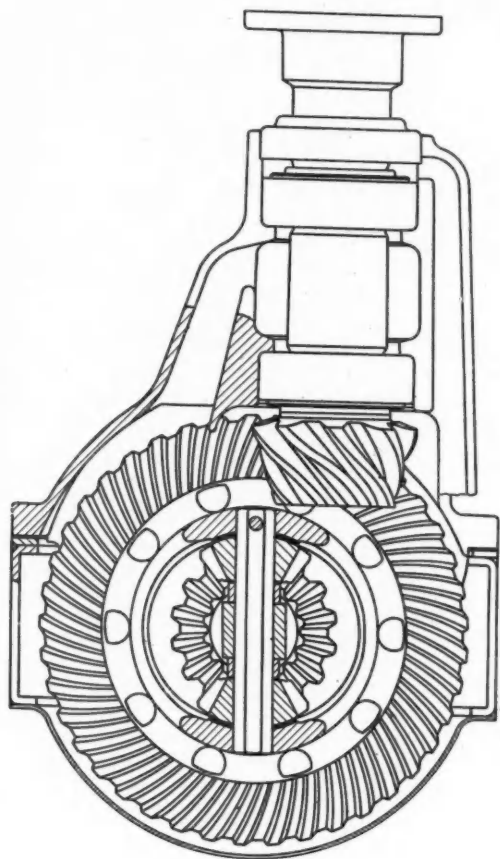
Pressure for the lubricating system is maintained by a submerged gear type oil pump, driven by spiral gears. Oil is pumped directly into a twin type full flow filter and thence to a rifle drilled passage running the length of the crankcase at the convergence of the cylinder barrels. Oil is fed through vertical drilled passages to each of the main bearings and through the drilled crankshaft to each of the connecting rod bearings. A vertical lead drilled in the front of the block feeds the front cam shaft bearing and the valve rocker shaft, while a manifold provides pressure lubrication to each of the idler gears and accessory shafts.

Cooling water is circulated by a gear driven centrifugal pump mounted on the right hand side of the engine. The water is introduced into a longitudinal cored passage between the cylinder banks from which it is distributed.

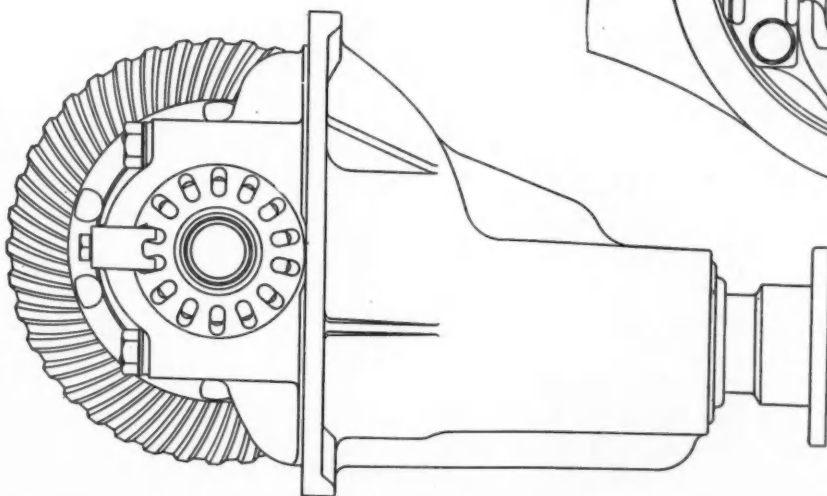
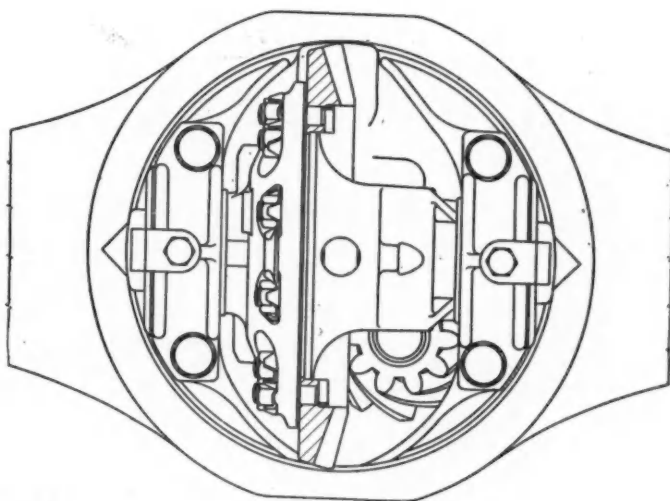
Provision is made for single ignition by either a single 12-cylinder distributor mounted on the right hand side of the engine just back of the timing gear case, or by two six-cylinder distributors, one mounted on either side of the engine. Provision is also made for two independent battery ignition systems or for independent battery and magneto ignition.



The DeSoto Hypoid



No. 38 in the AUTOMOTIVE INDUSTRIES
Engineering Drawing Series.



DeSoto model S-3, ratio
4.10, teeth on ring gear,
41, teeth on pinion, 10.

Plant Notes

(Continued from page 171)

Announcement has been received from the Lincoln Electric Co., Cleveland, Ohio, manufacturers of arc welding equipment, of the opening of a new sales engineering office at Dayton, Ohio. The new office at 1508 Watervliet Avenue will be in charge of R. P. Sharer.

Fleming Manufacturing Company, Providence, R. I., makers of Fram filters, announces that, as of June 10, sales from Jan. 1, 1937, exceeded the company's total sales for the entire year of 1936. An additional 25,000 sq.

ft. of floor space has been added by the opening of a new plant at East Providence, R. I., bringing the total floor area to over 100,000 sq. ft.

The company has opened an office in the General Motors Building, Detroit. Roy C. Noll is Detroit manager with Ralph H. Card in charge of engineering.

Production of glass automotive novelties will be started by the recently formed W. J. C. Manufacturing Co., at Warren, Ind., in the early fall.

Stepping up production in its Clintonville plant to meet orders, the Four Wheel Drive Auto Company has purchased \$125,000 in new machinery and equipment.

Installation of \$20,000 in heat-treating equipment for its metallurgical department alone is being carried out. Two of the new furnaces are of the recirculating type. The others are of the oven type. Furnaces are automatic, controlled by electrically operated, temperature control devices. Installed in a central temperature control room, these machines automatically record the temperature of each oven during the progress of each load being heat-treated.

In the manufacturing department, new production machinery includes lathes; turret lathes; automatic, hydraulic stub-lathes; a multiple drill; radial drill; two-spindle drill; and single-spindle drills. A new milling machine, two bull-dozer for shaping metal tubing, a hobbing machine, a surface-grinder, an electric floor crane, and gear-shavers are among the other new machines.

French Seek Higher Duties

Proposal Is Made to Raise Imports on Cars, Trucks

Claiming that she is insufficiently protected against foreign competition, a project is now before the French tariff commission to increase the general ad valorem duties on complete vehicles and chassis to 73.8 per cent and to 62.8 per cent on trucks; the minimum rates would be increased to 47.2 per cent for passenger cars and chassis and 40.2 per cent for trucks.

This measure, which can be put into effect by decree, is directed against the United States. According to the latest statistics, France imported 1403 automobiles in 1936 (877 passenger cars and 526 trucks). So far as passenger cars are concerned, these are the lowest figures on record. The highwater mark was in 1925, when 16,213 passenger cars were imported.

In addition to complete automobiles, France imported 54,781 metric tons of spare parts and 12,650 metric tons of bodies during the year 1936. These weights correspond, approximately, to 5600 automobiles. Of these totals 48,496 metric tons of parts and 11,688 metric tons of bodies came from the United States. These imports are lower than those of 1934 and 1935 and are only slightly above those of 1933. In view of these official figures some find it difficult to see in what way the French automobile industry is threatened and why an increased tariff should be necessary.

Chile Increases Quotas

The Chilean Government has established increased quotas of 1330 passenger automobiles and 781 truck chassis for importation from the United States during the quota year ending September 30, 1937, according to a cablegram from Commercial Attache Merwin L. Bohan, Santiago. This results from Chile's increasing the former import quotas for automobiles from all countries by 33 per cent, the report states.



METAL SPHERES WITH LAPPED SURFACES

Strom Steel Balls possess that extra measure of quality by means of which the ultimate in ball bearing performance is achieved.

This special lapping practice is exclusive with Strom.

Physical soundness — correct hardness — size accuracy and sphericity are guaranteed in all Strom Balls.

Other types of balls — STAINLESS STEEL — MONEL — BRASS & BRONZE — are also available in all standard sizes. Write for full details.

Strom

STEEL BALL CO.

1850 So. 54th Avenue, Cicero, Ill.

The largest independent and exclusive Metal Ball Manufacturer

August 7, 1937

Automotive Industries

No "Wildcat Strikes"

(Continued from page 169)

an automobile driven through their line by the plant superintendent. The injunction was addressed also to striking employes of the Albion Malleable Iron Co. and officers of the International Molders Union. Latter union is asking closed shops and wage and hour adjustments in both plants, which employ more than half of the city's labor. Packard Motor Car Co. and Midland Steel Products Co. have filed writs of replevin in Circuit Court for release of patterns held in the strike-bound Malleable Iron Co. plant.

Car Price Body is Formed

(Continued from page 169)

marked that safety will be improved through the requirement that every traded car is to be made "safe and saleable."

Mr. Teefy denied that the price schedules to be set up will be price fixing. He said that they will result from averaging actual prices paid by the public during the preceding 30 day periods, less the cost of needed repairs.

Manufacturers Group Grows

Expansion plans are being worked out for the Associated Manufacturers' Representatives Group, formerly known as the Group of Manufacturers' Representatives, it is announced by Neil W. Jones, Richmond, Va., chairman.

The association comprises non-competing firms of manufacturers' representatives with membership limited to one firm in each section of the country. The purpose is to aid members to exchange ideas and data through the secretary J. P. Coulter of Williamsport, Pa. The organization is said to resemble a non-competing group of jobbers who have been exchanging information for several years. The association covers Canada, Mexico and the United States, although some of the United States markets are not yet fully covered.

Directors, in addition to Mr. Jones, include Martin Engers of Winnipeg, N. E. Williams of Atlanta and David Coulter of Pittsburgh.

SEC Reports Share Dealings

Securities and Exchange Commission reports show that in May H. H. Smith, officer and director of Federal Motor Truck, disposed of 200 shares and held 22,950. W. R. Tracy, officer and director of Hudson Motor Car Co., acquired 500 shares and held a total of 627. John L. Cotter, officer of the Hupp Motor Car Corp. acquired 200 shares of new \$1 par common. H. H. Smith, a director, exercised rights to subscribe and acquired 12,900 shares, holding 13,900. He acquired 1000 shares previously by exchange for old stock, having acquired 1900 shares of old stock in April.

June reports disclosed the purchase of 400 shares of Borg-Warner Corp. \$5 par common stock by P. D. Armour of Chicago, a director. He held 5000 shares at the end of

the month. A holding company acquired 3700 shares of Briggs Mfg. Co. common and held 443,600 shares. D. J. Campbell, officer and director of Campbell, Wyant & Cannon, disposed of 3700 shares and retained 20,425 while G. W. Cannon of the same company gave away 400 and sold 200 to reduce his holdings to 34,807 shares. The Duncan Finance Co., reporting through A. E. Duncan, chairman of the board of Commercial Credit Co., gave away 200 shares and held 41,800. Babson's Statistical Organization bought 885 shares of Gamewell Co. common, and held 20,619. The company makes street signalling devices.

A large number of small dividend transactions in General Motors stock were accomplished by various officers and directors through the Management Corp. A number of dividend and share exchange transactions

in Greyhound Corp. were consummated through holding company adjustments. C. L. Barnes, director of Houdaille Hershey Corp., through a trust, disposed of 300 shares of class A stock and held 3000.

Covered Wagon's New Model

Entrance of Covered Wagon Co. into the low-price trailer field with a new 17 ft. model designed to sell for \$298, unfurnished, has been announced by A. G. Sherman, president. At the same time a unique plan for merchandising the new trailer was revealed. The trailer, to be known as the Pacemaker, will be sold unfurnished, like a home. The purchaser may obtain a trailer home with a small investment and add to its equipment as he desires.



Immediate Steel

PARTIAL LIST OF PRODUCTS CARRIED IN STOCK.

Bars • Structural • Shafting
Plates • Iron & Steel Sheets
Alloy Steel • Tool Steel
Welding Rod • Spring Steel
Strip Steel • Tin Plate
Stainless Steel Sheets, Bars,
Etc. • Mechanical Tubing
Rivets • Bolts • Nuts, Etc.

● There is hardly a product in the steel and allied lines that you cannot secure quickly and economically from the nearest Ryerson plant. Stocks that include more than 10,000 sizes and kinds of steel and allied products . . . modern handling and cutting facilities . . . and special dispatching methods assure accuracy, dependability and speed. When you need steel, call on Ryerson. Ten plants stand ready to meet your requirements.

JOSEPH T. RYERSON & SON, INC.

Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

RYERSON

Minneapolis-Moline Flexibility

(Continued from page 186)

rough-bored and then finish-bored in two settings on the boring machine, which is fitted with a double station fixture. In each operation, the burden of the cut is taken on two separate fly-cutters, mounted on the same bar and so located that the roughing cutter enters first and is followed by the finishing cutter. An interesting detail on the finish-bore station for the small end

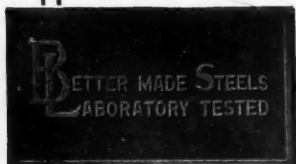
of the rod is the use of the unique Packard thin flat-sided cutter for reaming.

Rods for the larger engines, which have babbitt bearing big ends, are finished on a special horizontal two-spindle boring machine. Here the roughing cut is taken by cemented-carbide tipped cutters, followed by a diamond tipped fly-cutter for the finishing cut. Both cutters are mounted on the same bar.

The Precision of your Product Begins in



Cold Drawn Bars
Ground Shafting
Ultra-Cut Steel
Extra Wide Flats
Alloy Steels



BLISS & LAUGHLIN, INC.
HARVEY, ILL. Sales Offices in all Principal Cities BUFFALO, N.Y.

COLD DRAWN STEEL as manufactured in B & L mills under the close supervision and step-by-step inspection—which have made B/L quality a trade standard in the automotive industry—is the key to good construction and dependable performance in motor cars. Accurate steels—meaning not only maintained tolerances, but grades of steel exactly fitted for the job they must do—are economical steels to use in assembly operations, as well as to increase car values by their greater serviceability. Your inquiries are invited.

*** RE CRANKCASE**—Although this case is a relatively huge and heavy casting, its processing is rather simple so far as number of operations go, due to the use of the Carlton radial drills manned by skilled operators. Several of the items of equipment are worthy of special mention.

The third operation takes place in a huge Warner & Swasey turret lathe in which all turning and facing operations on the bell end are done in one setting. The tooling of the turret is most distinctive as it employs the use of all the tricks of the tool engineer. Without going too far into the details, we may say that they use cemented-carbide tips, J-metal, and high-speed steel, disposed according to the surface speed of the areas to be cut—high-speed steel, for example, being used at points of lowest surface speed.

The fourth operation is handled on a three-head Ingersoll boring machine of the well-known, Power-Pack type. Its distinctiveness lies in the unit type construction with individual heads mounted on a special base, thus making it possible to salvage much of the initial investment in the event of a serious change in product design.

RE CYLINDER AND HEAD—On this engine the cylinders are cast in pairs, the head being a part of the cylinder casting with the cylinder bore a blind-end hole.

The routing gives the detail of operations and it may be noted that here, too, the Carlton radial drill is used for various drilling and tapping operations. The Ingersoll two-spindle boring machine indicated on the routing is used for all sizes of engines built in this plant, having adjustable spindle centers to accommodate different cylinder spacing.

The Natco multiple drilling machine is another new piece of equipment and is tooled for drilling, reaming, and other operations on valve guides and valve seat insert counterbores. This machine is of universal character and is adapted for performing similar operations on all kinds of blocks.

Particular attention is drawn to the Heald precision boring machine set-up in this department. This is a four-spindle horizontal boring machine of the same type as is used in Cadillac production. The spindles are adjustable as to spacing to accommodate a variety of centers, permitting the boring of the entire range of blocks produced in this plant.

Precision boring by Heald is the now familiar single-point cylinder boring method. However, M-M has introduced an important variation. The job is so well done with respect to size, roundness, and alignment that honing is entirely dispensed with.

RE CRANKSHAFT—It is of interest to note that Landis grinders are used for all grinding operations including the rough-grind of all pin bearings from the rough forging, dispensing with the customary pin lathe operations.

The very latest installation of the familiar Leland-Gifford sensitive drill with the hydraulic step-by-step feed mechanism is used for drilling the oil holes. This is a two-head machine and is shown in the pictorial section.

The Barber-Colman taper spline hobbing machine is used for cutting the taper spline end for the flywheel.

As shown in the pictorial section, they have installed one of the largest of the Tinius-Olsen dynamic balancing machines. It is much too large for the RE shaft but it doubles in brass by accommodating every shaft in the varied M-M line of engines.

RE COMBUSTION CHAMBER COVER—This is a relatively small part and is finished in four operations—milling on the Newton Rotary, drilling on a Natco multiple spindle press, counterboring and tapping on a Carlton Radial, and the water test.

The milling operation takes place on the same machine as is used for the cylinder block. The fixture is so arranged that blocks and covers are finished in pairs in the same setting.

The foregoing gives briefly the high spots of a very interesting automotive operation and represents the first study of tractor production in the present series in **AUTOMOTIVE INDUSTRIES**.

It should be of vital interest to all production men in the industry since it covers an operation involving only moderate volume in which many of the machining problems are of job-lot nature. Because of the economic limitations inherent under the circumstances, production men will admire the skill with which the modernization program has been developed and the remarkable facility with which equipment and technique of the most advanced nature have been adapted.

Measuring Thickness of Nickel Coatings

A NEW "magnetic" method of measuring the thickness of the coating of nickel-plated articles is described in Research Paper RP994 of the National Bureau of Standards "Magnetic Method for Measuring the Thickness of Nickel Coatings on Non-Magnetic Base Metals," by Abner Brenner. The method depends on the force of attraction between a permanent magnet and the nickel coating. It is well known that nickel is paramagnetic and has a magnetic permeability about one-

fourth that of iron. In research work carried out at the Bureau, it was found that the attractive force between a permanent magnet and thin layers of nickel, having the same magnetic permeability, are proportional within about 10 per cent to the thickness of the layers, for nickel coatings from 0.0005 to 0.025 mm. (0.00002 to 0.001 in.), which is the range of thicknesses of practically all commercial nickel coatings on non-ferrous base metals.

In principle the proposed method involves merely the measurement of the force required to detach one pole of a

permanent magnet from the nickel coating, and the comparison of this force with that required to detach the same magnet from a similar nickel coating of known thickness.

Nickel coatings deposited under different conditions have somewhat different magnetic permeabilities. It was found that if such coatings are annealed at 750 deg. Fahr. they acquire about the same permeability.

Copies of RP994, which describes the method in detail, can be obtained from the Superintendent of Documents, Washington, D. C., at 10 cents.



A Real Sales Asset

Sylphon Thermostats have been a real contributing factor in increasing motor efficiency and fuel economy of modern automobiles. Held to high standards of quality, Sylphon Thermostats provide uniform dependability throughout a long life span of useful efficiency.

FULTON SYLPHON COMPANY, KNOXVILLE, TENN.

NEW DEVELOPMENTS

Involute Splines

... broached inside propeller shaft tubes by vertical pullup 15-ton, 60-in. stroke machine

A Colonial Broach standard heavy-duty, vertical pullup 15-ton, 60-in. stroke machine was recently adapted to the cutting of involute splines inside a propeller shaft tube.

Operation of the machine is as fol-

lows: In the loading position the broach is located in the base of the machine. After the tube is placed over the upper end of the broach, the machine is started, causing the broach to be shuttled upward by a cylinder in the base of the machine until it engages with an automatic puller in the pull-head of the ram.

The ram then rises, pulling the broach through the tube, roughing and

finishing the splines in one stroke. At the top of the stroke the tube is released and removed. The ram returns the broach to the base of the machine and releases it for loading of another tube.

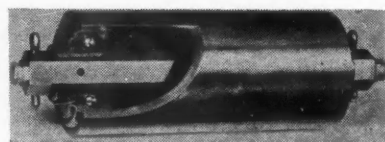
Production is said to be 139 pieces per hr. at 85 per cent efficiency.

Conveyer Roller

... of 3½-in. O.D. seamless steel tubing; capacity 2200 lb.

Addition of a newly developed conveyer roller to its present line has been announced by the Mathews Conveyer Co., Ellwood City, Pa. The roller is made of 3½-in. O.D. seamless steel tubing having 5/16-in. wall thickness. The bearing has steel inner and outer labyrinth seals, hardened inner and outer ball races, and 13 9/16-in. diameter hardened steel balls, assembled within a pressed steel jacket. Rated capacity of the assembled roller is 2200 lb.

The roller can be furnished in lengths ranging from 6 in. up to 48 in. and can be spaced in the frames on centers ranging from 4 in. up.



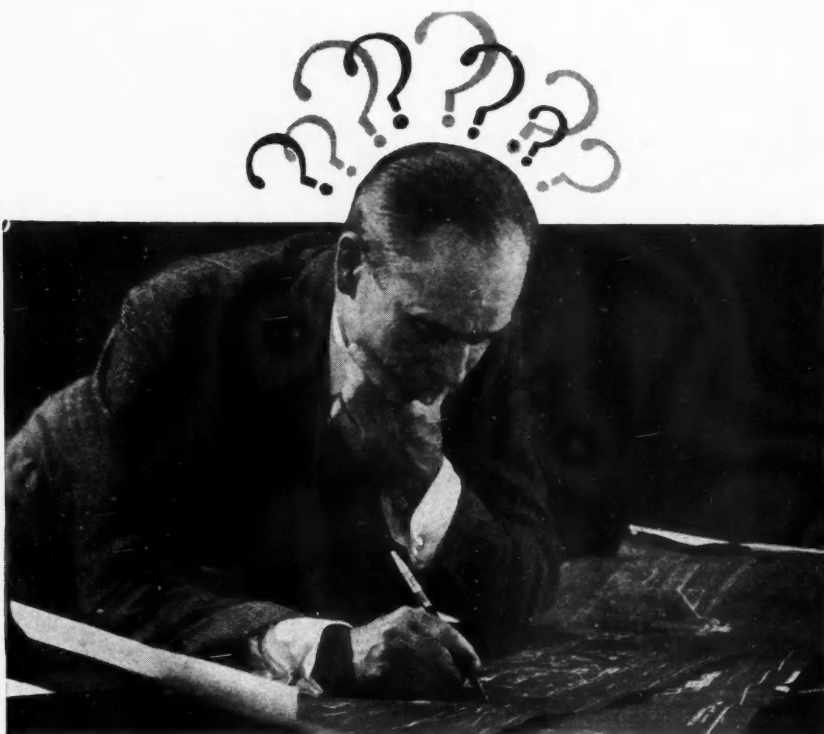
Mathews conveyer roller of 2200 lbs. capacity

Finishes

... tested for wear resistance, toughness, adhesion and rub-off qualities by new machine.

A precision testing machine for measuring wear resistance, toughness, adhesion, and rub-off qualities of surface finishes such as enamels, electroplate, anodizing, molded plastic sheets and leather coverings has been developed by the Tabor Instrument Co., North Tonawanda, N. Y.

There are two sets of standardized accessories available for the main unit as follows: (1) toughness and adhesion test assembly with standardized tungsten carbide tipped cutting tool to determine dig resistance, toughness and adhesion of enamel finishes. A contour blade removes enamel coating down to the metal specimen plate under a loading indicated on the scale beam. Toughness or dig resistance is rated by the load required to drive the tool completely through the coating. Poor adhesion is indicated when the enamel chips away from the specimen plate as the sharp edge of the tool



**SAY *Goodbye* TO CLUTCH
RELEASE BEARING PROBLEMS**



BEFORE you O.K. the clutch assembly drawings of your new model, just remember you can answer those irritating clutch release bearing problems by specifying Aetna T Type Bearings. They do away with costly machining operations for oil fittings, for unlike the conventional type, Aetna T Type Clutch Release Bearings are lubricated for life and so designed that Centrifugal and Centripetal forces keep the balls constantly bathed in lubricant. They put an end to the premature wear and ultimate failure caused by eccentric thrust because the famous Aetna "T" shaped ball retainer compels perfect and permanent alignment. That means smooth, silent, troublefree performance for the life of the car. Millions are in use in a big majority of passenger cars, trucks, buses, and tractors. Time and every conceivable test have proven their right to your preference. Write for sample bearing and full engineering data.

AETNA BALL BEARING MFG. CO.

4608 SCHUBERT AVE., CHICAGO

DETROIT OFFICE 7310 WOODWARD AVE.

shaves the coating. (2) Smudge and rub-off test units with one sq. in. of surface held in contact under 2 kg. load, also can be used for determining print resistance of varnishes and enamel finishes.

The mechanism itself consists mainly of a power driven specimen holder, a reset counter, two ball-bearing pivoted pendulum arms on which are mounted wheels made of a resilient abrasive

by rotation of the cross feed hand-wheel, starting automatically when the grinding wheel is advanced toward the work and stopping when the wheel is withdrawn to unloading position. A lever permits cutting out the headstock and coolant pump motors when wheel-truing or setting-up.

Wheel spindle, headstock, table and coolant pump are driven by separate motors, a push button station at the front controlling the starting and stop-



Tabor instrument for testing surface finishes

composition. Wheels are offset relative to the center of the specimen holder resulting in a criss-cross abrading action as one wheel rubs from the inside of the wear pattern outward and the opposite wheel from the outside inward. The motor drives the specimen through approximately 50 wear cycles per min.

Cylindrical Grinding

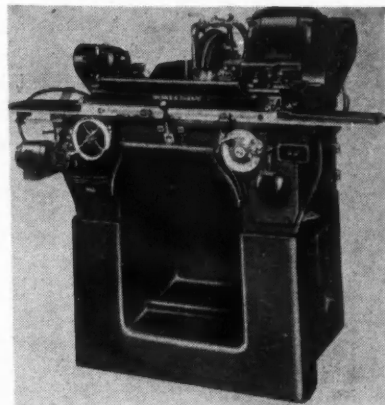
... of duplicate small parts to close limits on a production basis.

For rapid cylindrical grinding of duplicate small parts to close limits on a production basis, the Brown & Sharpe Mfg. Co., Providence, R. I., recently developed the No. 5 machine. It is available in two capacities: 3 in. by 12 in. and 3 in. by 18 in. Center swing over the table is 3 31/32 in. A 14-in. wheel clears work to 3-in. diameter. Maximum diameter of work recommended for efficient production grinding is about 1 in.

Speed of the wheel spindle is 1776 r.p.m. An additional speed of 2045 r.p.m. is provided to give correct surface speed as the wheel wears. Four work speeds of 202, 319, 505, and 800 r.p.m. are obtained through a pair of 4-step cone pulleys.

All operating controls and adjustments are grouped at the front of the machine. Headstock and coolant pump are started and stopped electrically

Brown & Sharpe machine for rapid cylindrical grinding of duplicate small parts



Forgings with a background—
Behind every Wyman-Gordon forging
stands diligent scientific examination
of every bar of steel—continuous lab-
oratory control of all processes.

WYMAN-GORDON

Worcester, Mass. Harvey, Ill. Detroit, Mich.

ping of the entire machine. All electrical control units are built into the machine. An automatic oiling system lubricates the wheel spindle bearings,

the cross feed screw and full nut, the table and cross slide ways and the table driving mechanism of the machine.

Railcar Practices Discussed

AT an International Railway Congress held in Paris last June, one of the topics discussed was that of railcars. Three reports were presented, one by E. Wanamaker, covering North and South America, China and Japan;

a second by H. Stroebe, dealing with Germany, Poland, Denmark, Norway, Sweden, Finland, Austria Hungary, Switzerland, Czechoslovakia, Yugoslavia, Bulgaria, Roumania, Greece, Turkey and Egypt, and the third by

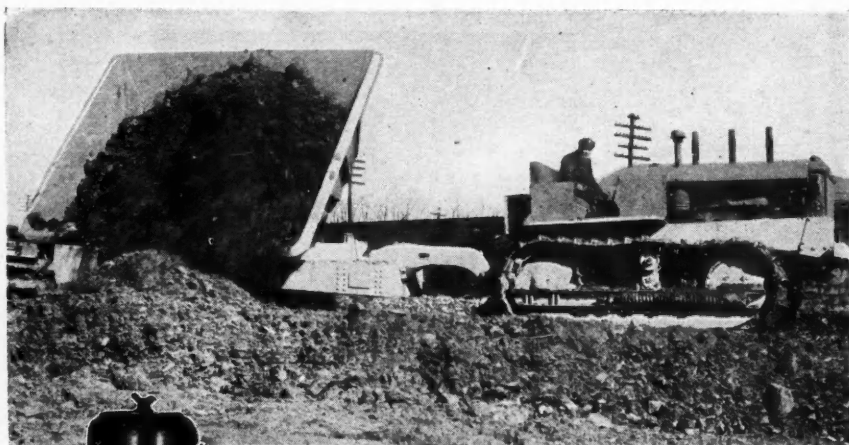
L. Dumas and J. Lévy, covering France, Belgium, Holland, Great Britain (all with their respective colonies), Spain, Portugal and Italy. The three reports were summarized by L. Dumas, whose conclusions were as follows:

The problems of speed, acceleration, braking and safety have been satisfactorily solved in recent years, and the future of the railcar now depends on the measures adopted to assure comfort, low maintenance cost, and seating capacity. It is also dependent on future improvements in the track and on the adaptation of operating methods to suit this type of vehicle.

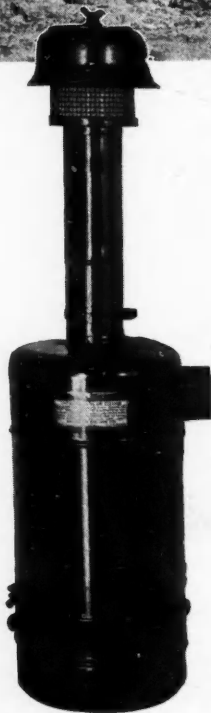
Diesel engines for railcars can be divided into three classes, viz., those of 600-1800 hp., which are relatively heavy but very economical and extensively used in the U. S.; engines of 300-600 hp., weighing about 11 lb. per hp., as adopted by most European railways, and engines ranging from 200 to 300 hp., among which horizontal types developed in Germany, France and Czechoslovakia should be mentioned. Supercharging, which is coming into wider use, permits of increasing the power/weight ratio, while more effective operation and better dissipation of the waste heat are also obtained.

Mechanical transmissions are quite satisfactory from the standpoints of weight, cost, and efficiency up to 300 hp., and transmissions of this type up to 500 hp. are being tested in Italy and France. Electrical transmissions are preferred for use on mountain lines and for multi-unit operation, while hydraulic transmissions have made definite progress during the past two years in Germany and Austria for all powers and speeds.

To reduce hunting to a minimum and thus increase passenger comfort, tires with a 1:40 cone, cylindrical tires, multiple-suspension gears and rubber shock absorbers are being used, and



Allis-Chalmers LO-6 Oil Tractor.



"CT" oil bath air cleaner for use on Tractor and Industrial type engines.

SPECIAL PROTECTIVE FEATURES RECEIVE RECOGNITION

United "CT" cleaners now standard equipment on all current models A-C controlled ignition oil engines. Special protective features against engine wear, as built into these new type cleaners, recognized by Engineering Department of Allis-Chalmers Manufacturing Co.

United "CT" oil bath air cleaners show same relative high cleaning efficiency at less than half loads as at three-fourths to full engine loads. They reduce oil "pull-over" danger to minimum at maximum engine loads—already adopted as standard equipment on other tractor and industrial power units of nationally known manufacturers.

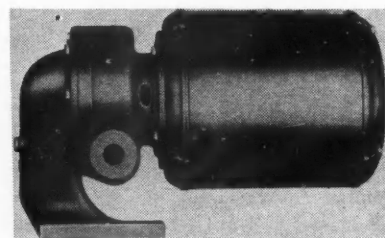
**BETTER ENGINE PROTECTION
IS OUR CONSTANT AIM.**

UNITED AIR CLEANER CO.

Division of UNITED SPECIALTIES COMPANY

9705 Cottage Grove Ave.

Chicago, Illinois



New model pump to handle coolant or lubricant for machine tools just brought out by the Pioneer Engineering & Mfg. Co., Detroit. The self-contained unit requires no suction piping, the intake being directly through the base bracket. Any type of liquid not too highly corrosive or viscous may be pumped. It is pointed out by the maker that no relief or by-pass valves are needed in the delivery line and that any degree of throttling may be accomplished without increasing the load on the motor

their use is recommended. Brake blocks are most generally used at present; in some countries their application is electrically controlled, in proportion to the operating speed. Mention should be made also of the disk brake, the eddy-current brake and the N.R. brake with double shoes.

Soundproofing and air-conditioning are employed as further aids to passenger comfort. Steel-tired vehicles can be improved from the silence standpoint by the use of double partitions. All openings should be closed, and the plates should be lined with felting to prevent vibration. Air conditioning and air cooling are greatly appreciated in summer in vehicles having fixed windows.

Maintenance and depreciation are the most important items in the operating cost. In the case of American vehicles, the first cost is high, but maintenance costs are reduced to a minimum. In Europe, on the other hand, the desire for lightness has led to the general use of a cheaper form of construction, entailing higher maintenance costs.

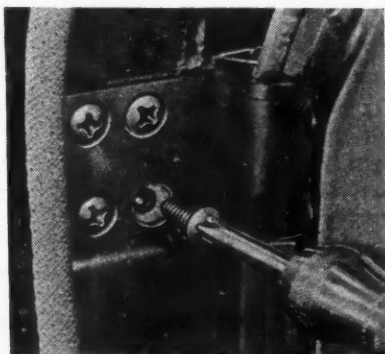
Most railways are inclined to go to railcars of greater capacity, with the object of substituting them for steam trains to an increasing extent. Several different types are being built, as, for instance, observation railcars, twin railcars or single railcars coupled together, and railcars hauling trailers in trains of from three to 17 vehicles.

It would be desirable if railway administrations in different countries adopted common methods of test for railcars and that the definition of the nominal power of engines be made the same in all countries.—*Engineering*.

Spring Making

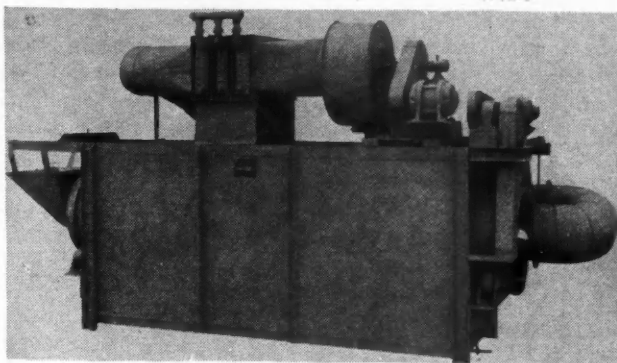
... new line of segment and clutch type coilers; also torsion spring machines.

The Torrington Mfg. Co., Torrington, Conn., has announced its entry



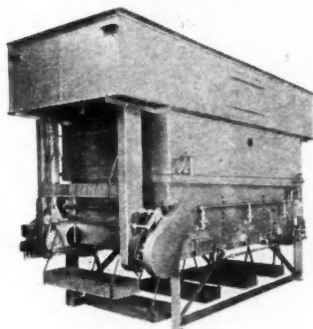
Automotive application of the recently developed Phillips recessed head self-centering screws, a product of the American Screw Co., Providence, R. I.

Automotive Industries



Blakeslee spiral drying machine with feed and discharge hoppers. Parts are dumped into the hopper and automatically carried through the machine. As they are turned over, hot air is blown on to the parts to dry them. Either steam or gas may be used for heating. Air is recirculated, but provisions are made to introduce fresh air and exhaust the moisture-laden air.

Let Blakeslee Cut Your Cleaning Costs



DEGREASERS

For perfect cleaning and drying in one operation, the Blakeslee solvent degreasing process cannot be surpassed.

It is fast, 100% cleanliness at all times, has the lowest labor requirements, and is safe.

Blacosolv is the super degreasing solvent. No fire hazards here!

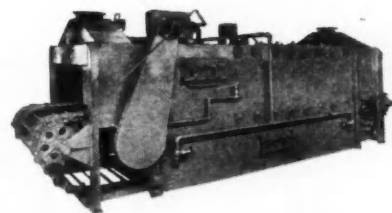
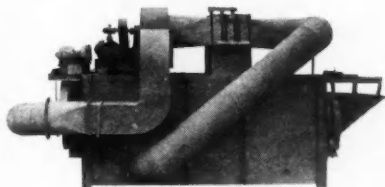
ALKALI WASHERS

Blakeslee Niagara and Pump type parts washing machines are known for their scientific and rugged construction.

Fifteen to twenty years of continued service is not an unusual performance for Blakeslee equipment.

Blakeslee Metal Parts Washers use a minimum of washing compound.

Cut your compound costs and reduce your man hours.



DRYERS

Here is your heat saver. Our experience and engineering give you the maximum dryer efficiency. Don't throw away those extra BTU's. Consult a Blakeslee engineer.

All Blakeslee alkali washers can be equipped with dryers using either steam or gas.

On the right is a spiral type small parts dryer used for drying after plating. Parts are rendered dry without streaks, spots, or stains.

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August 7, 1937

into the field of spring making machinery. The new line includes segment and clutch type coilers in eight sizes covering a range from 0.006-in. to 3/8-in. diam. wire and torsion spring machines in four sizes covering a range from

0.006-in. to 1/4-in. diam. wire. Tooling for any requirements within the range of these machines and attachments for long coils, square or odd shaped wire coiling rings will be supplied by the company.

Powder Shows Cathode Ray Tracing

IN a paper presented to the Institution of Electrical Engineers of Japan, Messrs. Suzuki and T. Tsuji describe an instrument which is based

on the principle that when a cathode ray impinges on a plate of insulating material, it is stopped and a negative electrical charge is formed at the point of

impact. Under these conditions the beam of an oscillograph traces on such a plate an invisible diagram. In order to make this diagram visible one applies to the plate a uniform coating of powdered minium and sulfur.

The minium, becoming positively charged, adheres to the parts of the plate which are negatively charged, whereas the sulfur, which becomes negatively charged, is repulsed by the charged portions of the plate and drops away. In this way an oscillogram in the form of a red trace is obtained. Tests showed that the best results are obtained if hard rubber is used for the insulating plate. The powder used in most cases was lycopodium, the yellow color of which gives a trace which stands out sufficiently from the dark background. By covering with powder the side of the plate which is not exposed to the cathode rays, an oscillogram is also obtained, but which is not so sharp as that given by the other side of the plate. The linear velocity of registration obtained by this method was as high as 2000 meters per second and probably may be increased still farther by increasing the intensity of the cathode ray.—*La Technique Moderne.*

To Lengthen Tire Life

A NUMBER of new chemical developments of possible automotive interest are being reported from Germany. According to tests made at the Draeger Works (in Lubeck), tire tubes wear out prematurely if inflated with air from a compressor. Atmospheric air always contains a certain amount of moisture, and the moist air on coming in contact with the cylinder walls of the compressor absorbs lubricating oil. This mixture of oil and water is quite injurious to the rubber of the tubes. By inflating the tubes with nitrogen from a steel bottle, it is claimed that not only can the inflation be effected more rapidly, but the tubes will always remain dry, which increases their life materially.

Two chemists at the research laboratory of the Mathias Stinnes Mines have perfected a new method for the extraction of motor fuel from coal. By means of a mixture of solvents (tetraline and phenol or tetraline, naphthalene and phenol) they extract from coal up to 80 per cent, and from lignite up to 84 per cent of a liquid having a heat value of 15,500 B.t.u. per pound, and the ash content of which is less than 0.1 per cent. These extracts, moreover, are said to be much more susceptible to hydrogenation than the coal itself.

DERMA-SAN

DISINFECTANT

gives you *these extra*
Advantages



PROTECTION AGAINST OIL DERMATITIS
Poured into cutting lubricant, Derma-San quickly kills pus-forming germs before they attack your workers. Yet it is non-poisonous . . . does not irritate the skin.



MONEY-SAVING ECONOMY
A little bit of Derma-San goes a long way. One pint added to 35 gallons of lubricant gives absolute protection against this dreaded skin disease.



NO CLOGGED FEED PIPES
Derma-San is a colloidal disinfectant. That means the ingredients cannot separate or bunch up in the feed pipes. Your machines always operate when you use Derma-San.



SAFETY TO MACHINED PARTS
You can use Derma-San with absolute safety on all types of metal. It eliminates the danger of rusting or discoloration on the finest machined parts.



FOR GENERAL PLANT DISINFECTION
You can use Derma-San in scrub water for mopping and cleaning. It can be used in sprays for settling dust. It is effective against all forms of bacteria.



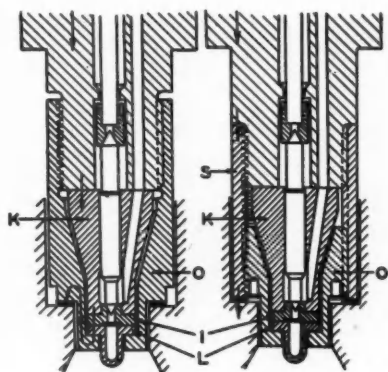
The HUNTINGTON LABORATORIES Inc.

DEPT. H HUNTINGTON, INDIANA TORONTO

Carbon monoxide, which is obtained in large quantities as a by-product in many chemical processes, and of which no practical use is made in most cases, can be made to yield a superior grade of lamp black by a process due to Dr. Th. W. Phirmann of Mannheim and Dr. G. Gross of Oppenau. The gas is kept in contact with sheet-metal discs whose surfaces are of a metal having strong catalytic properties, which results in a continuous production of lampblack by catalytic decomposition. The lamp black is removed from the discs by a continuous process, by means of other metal discs moving in the opposite direction to those on which it is deposited.—*Chimie et Industrie.*

Improved Type of Injection Nozzle

THE fuel-injection nozzles of Diesel engines sometimes give trouble because the guides of their valves are distorted by the pressure due to the nozzle-retaining means. The cause of this trouble can be eliminated by suitable design, and the two sectional views



Conventional injection nozzle and improved design in which the valve guide is not subjected to the pressure of the nozzle retaining means.

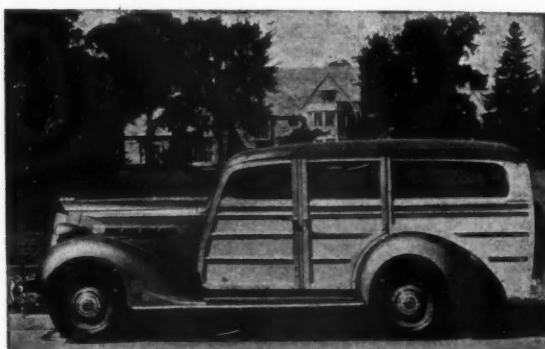
reproduced herewith illustrate, respectively, a conventional design and an improved one in which this defect is overcome. The improvement is due to the firm of Gebr. L'Orange, and a design patent has been issued on it in Germany.

In the conventional design (left-hand view) the valve, valve-guide *K*, valve plate *I* and valve cap are held in place by the screw cap *O*, which when drawn up subjects the valve guide to a certain pressure. The entire nozzle is held in place in a counterbore in the cylinder

head by retaining means which force it with great pressure against the gasket at the bottom of the counterbore.

If the threads of the screw cap are shown diagrammatically, as in the right halves of both views, it is easily assumed that the retaining pressure is transmitted directly from the nozzle body to the screw cap through these threads. However, screw threads must always have a slight play, and when the screw cap is drawn up the play naturally is on the upper side, which means that the retaining pressure cannot be transmitted through the threads.

It must therefore be transmitted through the valve guide *K*, the valve plate and the valve cap *L* to the relatively thin bottom of the screw cap *O*, as indicated by arrows on the lower parts of the sectional views. This results in great additional stresses in the valve guide *K*, which may be distorted in consequence. In the design shown on the right, the pressure of the retaining means is transmitted from the nozzle holder or nozzle body through the nipple *S* directly to the gasket, and distortion of the valve guide is thus avoided.—*ATZ.*



Tego-Bonded Packard Station Wagon body built by Baker Raulang Corp.—plywood by Davis Plywood Corp.

TEGO-BONDING

MEANS EXPOSURE-PROOF PLYWOOD

PLYWOOD that is really proof to water, weather and mold has become an established commercial product in the past two years.

Tego-bonding—gluing with dry resin film adhesive—has made the availability of such a material a fact.

Tego-bonded plywood offers not merely improved resistance to moisture and exposure breakdown. It offers permanent assurance against delamination due to glue deterioration, whether from water, climate changes or mold growth.

Tego Resin Film is manufactured by *The Resinous Products and Chemical Company, Inc., Philadelphia, Pa.*



RESINOUS PRODUCTS

THEY PAY THEIR OWN WAY



CASE STUDY No. 167

Name of Company ~~XXXXXXXXXX~~

Address ~~XXXXXXXXXX~~

Number and rating of National Acme Screw Machines on this job 2 3 1/2-inch Model R-4 spindles

Name of parts being produced Drive pulley for refrigerator V belt

Production rate Higher than estimates

Down time Negligible

Finish and accuracy Excellent-concentricity extremely good, which means an elimination of vibration

Maintenance cost Negligible

Are secondary operations eliminated? Yes - on shaving groove for finish

Other advantages of National Acme machines on this job. This part was formerly a casting. It is now made better and cheaper on these automatics.

How long will it take the new machines to pay for the original investment? Approximately one year

Signed W. D. Y.

*NAME ON REQUEST

Automatic Screw
Machines
Dies and Taps
Positive Centrifuges
The Chronolog
Contract Manufacturing

NATIONAL